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# REPORT

OF THE

## ROYAL ACADEMY OF MEDICINE,

TO THE

## MINISTER OF THE INTERIOR,

UPON THE

# CHOLERA-MORBUS.

PUBLISHED BY ORDER OF THE

**FRENCH GOVERNMENT.**

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TRANSLATED FROM THE FRENCH BY
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TO

**THOMAS COCK, M.D.**

VICE-PRESIDENT OF THE

UNIVERSITY OF THE COLLEGE OF PHYSICIANS AND SURGEONS

OF THE STATE OF NEW-YORK,

ONE OF THE PHYSICIANS OF THE NEW-YORK

HOSPITAL, &c.

THIS TRANSLATION IS INSCRIBED

BY HIS VERY MUCH OBLIGED AND OBEDIENT SERVANT,

**JOHN W. STERLING.**

## TRANSLATOR'S PREFACE.

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The following translation has been undertaken with the view of introducing into general circulation the opinions entertained by some of the most enlightened physicians of France, and of the numerous authors whose works they have carefully investigated, relatively to the history, nature and most approved treatment of the Spasmodic Cholera.

The great ravages already committed by this disease, and the rapidity with which it has extended to different and numerous kingdoms of the old world, have excited alarm and apprehension in the breast of almost every individual of this country. Indeed, reigning as an epidemic, we have great reason to apprehend its awful visitation, and in order that it may not come upon us unawares, it is incumbent, on physicians especially, to apply to every source whence they may ascertain the best means of preventing its invasion, restricting its limits, and subduing its deadly effects in those who may become the subjects of it.

Previous to the reception of the Report of the French Academy in our city, the excellent Discourse by Prof. J. M. Smith, on the Epidemic Cholera, had been for

some time before the public. In collating this discourse with the report of the Academy, we were struck with the similarity of their conclusions; yet it could be no longer a matter of surprise when it was fully ascertained that the method adopted by both parties, in order to arrive at these conclusions, had been exactly similar, viz., the deep and accurate investigation of every important accessible document relating to the subject of Cholera, allowing their deductions to flow, as it were, naturally, from the various sources whence they had originated.

Yet, notwithstanding their general resemblance, there are one or more points on which a difference of opinion exists: we are disposed to believe, however, that these discrepancies are more apparent than real, and that there would be no great difficulty in reconciling them. We allude to the contagious character of the Cholera; the authors of the subjoined Report, as will be seen on examining it, being of opinion that this disease has, under certain conditions, been communicated by personal contact.

That persons in constant and untiring attendance on the couch of an individual labouring under the Cholera, are more liable to be attacked in their turn than those who keep aloof from the presence of the disease, we can readily conceive, and the reason seems obvious: the sick person is located in an impure atmosphere, probably in the very centre of the epidemic influence, he is surrounded by friends, all

eager to attend to his every want, who render the atmosphere still more impure by the exhalations which proceed from their lungs and bodies, probably equally prejudicial to health with the emanations arising from the diseased body: the minds of these friends are greatly distressed, both in consequence of beholding the agonies of the sufferer and anticipating the desolation which will attend on his taking off; the fatigue also, the want of sufficient and regular alimentation; all these circumstances constitute some of the most powerful predisposing causes of the disease. Can we wonder then that persons exposed to the influence of these causes should be more susceptible of an attack than those who are not subject to their influence? And can we be surprized that persons, unacquainted with the laws which govern epidemics, seeing attacks frequently and rapidly treading upon such exposures, should derive them from direct contagion? Is it not more natural to attribute the causes of violent effects to visible and palpable objects rather than derive them from occult invisible agents which have never been demonstrated to exist otherwise than from analogy? It ought not then to be a matter of surprise, to medical men, even if every instance of invasion of this disease were attributed, by those who cannot comprehend epidemial influence, to individual contagion.

We were almost on the point of uttering the wish that the disease were contagious, rather preferring its invasion in that way than in an epidemic

form ; for, in the one case, our quarantine laws would greatly tend to arrest its progress, or else we would be able to flee from its direful influence ; but, where it pervades the atmosphere, travelling on the wings of the wind, and may approach us in every gale that blows across the Atlantic, or descend upon us with dreadful rapidity from the northern extremity of Asia, we have great reason for the preference ; all human regulations being of no avail in stemming the current of the elements.

Sanatory measures, however, should be resorted to, especially such as have proved beneficial either in lessening the pre-disposition to the disease, or diminishing its violence among individuals or communities exposed to its invasion, and which are fully detailed in the report of the Academy.

There is one thought which has been elicited by a remark contained in the following pages, and which we consider of no small degree of importance : it is this :—

If the Cholera should invade our land, let there be a mutual understanding among physicians that they will reciprocally assist one another in the services they may render to persons attacked with this malady ; for this is a disease so terrible in its aspect, as to appal even the stoutest heart ; so dreadfully rapid is its progress, and so soon does it cover its victim with the semblance of death, that the physician might possibly consider it needless, in such a case, to attempt to snatch the vic-

tim from the reality, even though the effort might be most availing. Therefore is it necessary that physicians should strengthen the hands of one another, and by their united efforts persevere so long as life can possibly be supposed to exist; for it is thus alone that others have prevailed over this cruel, this merciless destroyer.

Finally, let the physician, who should be called on to succour an individual attacked with the Cholera, go instantly; let him not hesitate, through a fastidious adherence to the strict rules of medical ethics, and the fear of infringing upon the rights of a fellow-practitioner, to go on the instant; for, in this disease, life hangs on instants, and death waits not for ceremony.

# FIRST PART.

# REPORT

ON THE

# CHOLERA-MORBUS,

READ BEFORE THE

## ROYAL ACADEMY OF MEDICINE,

IN

GENERAL SESSION,

ON THE 26TH & 30TH JULY, 1831.

# REPORT

ON THE

# CHOLERA-MORBUS.

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THE Royal Academy of Medicine has received from the Minister, Secretary of State for the Department of the Interior, the following letter, addressed to its President, dated March 4th, 1831, which we will now read :—

"MONSIEUR LE BARON,

"The Board of Health* of Marseilles has written me, that, in consequence of the great number of vessels which arrive at that port from the Baltic and the Black Sea, it has great reason to apprehend that the Cholera-Morbus will make its appearance in the health establishments there situated; that, consequently, it cannot acquire too much information respecting this disease. It, therefore, beseeches me to consult, on the nature of the Cholera-Morbus as well as upon its most appropriate preventive and curative means, the Societies of Medicine and other learned

* Intendance Sanitaire.

bodies of the capital, in order that such means may be had recourse to in case their apprehensions should be realized.

"The Royal Academy of Medicine being constituted the legal counsel of the Government in every thing that concerns the public health, it is to it alone that I consider it my duty to address myself. I request you, M. le Baron, to invite this Society to undertake, with the least possible delay, the compilation of such instructions as may serve to direct the Boards of Health of the Kingdom in the application of those preservative and curative means which they should employ against the Cholera, and to enable them to recognise, in the surest possible manner, the symptoms of this cruel malady.

"I anticipate from the zeal for the public welfare, of which the Academy has already given so many proofs, that it will eagerly comply with this request, by furnishing me with the work in question.

(*Signed*)

MONTALIVET,
Peer of France, Minister of the
Interior, Secretary of State."

In consequence of this letter, the Academy appointed a Committee, composed of MM. Keraudren, Chomel, Coutanceau, Boisseau, Desportes, Marc, Dupuytren, Pelletier, Louis, Desgenettes, Emery and Double, for the purpose of preparing a Report upon this subject. It is the work of this Committee that I am deputed to submit to the Academy.

This is a grave subject, Gentlemen; it concerns almost every nation, whom it disturbs, whom it threatens, or whom it attacks in their dearest interests. The matter is arduous, immense; it is sufficient to tell you

that we will be minute, very minute. But in considering a question in which every thing is new to us, we must present to your view a summary of all the facts, of all the doctrines contained in the numerous documents in existence.

The symptomatology of Cholera, its necroscopic characters, the seat and nature of the disease, the chances of safety or of destruction, its treatment, the geographical march of the disease under the influence of causes which favour the extension of it, the prophylactic means and sanative measures employed, we have investigated; notwithstanding each of these divisions has been successively studied, first in Asia, and afterwards in Europe.

But then, when we shall have completed the reading and the discussion, the Academy will have shared in all the labours of the Committee, or rather these labours will have been executed entirely under its supervision. You will, we are persuaded, have no cause to regret so much pains bestowed, especially if we have had the happiness of rendering them profitable.

When the Academy shall have adopted the Report and its deductions, it will remain to digest a circumstantial instruction, addressed to the administrative authorities, to the members of the profession, and to the individuals of the countries threatened or attacked, in order to determine by elaborate and luminous details, what each should perform within the limits of its duties and jurisdiction.

Another work will also remain to be performed; it is a report upon the documents transmitted to the Academy, in order to establish their respective value, and determine the services which each author of these documents, in particular, shall have rendered to the Academy and to the Science. It is upon the accuracy of these documents, it is upon their completeness that the success of the Report depends.

For we have only been able to work from documents; and documents, whatever may be their accuracy, never come up to all the ideas, all the expectations, and all the exigencies of the mind which elaborates them.

Many deficiencies will fortunately be filled up by the young men, enlightened physicians, brave savans, whom the Academy has deputed at Warsaw and St. Petersburg.

Furthermore, if the investigation of such a subject, at a distance from epidemic danger and tumults, has its inconveniencies, it is on the other hand attended with its advantages. In this respect, it is with great epidemics, in the physical world, as with revolutions in the political: in the midst of the violent jars and sudden revolutions which, at intervals, agitate nations, contemporaries, during the strife of opinions and the shock of parties, may indeed collect materials or even draw up particular memoirs; but the history of these strange, these dreadful epochs, can only be written at a distance from the events which have accomplished them.

# REPORT.

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*Committee* :—MM. Keraudren, President ; Marc, Chomel, Coutanceau, Boisseau, Desportes, Dupuytren, Pelletier, Louis, Desgenettes, & Emery ; Double, Reporter.

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The Cholera-Morbus—as if this malady were the only, the exclusive malady, and that all others scarcely deserved the name—the Cholera-Morbus is a disease the knowledge of which ascends to the remotest times of medical observation. Already very clearly pointed out by Hippocrates, who subdued it by the assistance of warm fomentations, it has been admirably described by Araetius of Cappadocia. The perspicuous, concise, accurate and complete symptomatology, which this author, who wrote at the beginning of the fifth century, has recorded, compared even with recent descriptions, or those of the present day, scarcely leaves anything

to be desired by the most fastidious individual; and authors have scarcely done more than copy what Araetius long since wrote on the subject.

This disease, *sui generis*, the characters of which are distinct and constant, has frequently presented itself to the notice of observers of every country. It has often been observed appearing accidentally in a single individual or in several isolated persons, developed by the action of particular, idiosyncratic predisposing causes, and then confined to these narrow limits. In this state it is called sporadic; there is no physician, of ever so little experience, who cannot cite examples of it.

Neither is it rare to see the Cholera reign occasionally under the influence of a determinate constitution of the atmosphere, and in the form of a popular disease, or minor epidemic, as stated by Fouquet. This mode, more justly named catastatic, in order to express that it depends especially upon the regular but exaggerated constitution of the seasons, has often been the mode pursued by the Cholera. Thus was it recorded by Hippocrates in the seventh book on *Epidemics:* thus was it observed by Sydenham, in London, in 1669 and 1676; by Huxham, in 1741; thus was it noticed in Paris at different epochs, and more especially during the summer of 1730, and in July, 1780, at which times it was already remarked that the disease was more

fatal to men than to women. Thus was it described, in upper India, by Lebegue, of Presle, in 1762; Paisley, in 1774; by Sonnerat, from 1774 to 1781; by Curtis and Girdleston, in 1781 and 1782; Thomson, in 1787: thus did it appear to Doctor Noel, (then surgeon-in-chief of the expedition,) among the French troops who, during the last century, were sent to contest with England the dominion of the peninsula of India. Disembarked upon the coast of Coromandel, the French army suffered greatly from this epidemic, which was successfully treated by means of divided doses of Volatile Alkali given internally, repeated every two hours, and administered in an infusion of sweetened balm tea.

But under all these circumstances, the cholera has never extended beyond the influence of the medical constitution with which it was found connected.

The annals of science also present the Cholera in certain localities, in particular countries, this is the endemic Cholera. Bontius, who wrote in 1669, had already described it under this form in India. Dillon and Lind thus observed it in the same countries; and since that epoch, the useful labours and the learned memoirs of the Physico Medical Society of Calcutta, have derived similar results from clinical observations. This endemic Cholera

does not extend beyond the limits assigned to it by the local causes, of which it is the effect.

Lastly, the Cholera exists in the symptomatic form, connected in different cases with severe, acute diseases. In southern climates we find it connected with high grades of bilious fever, and with intense typhoid fevers. Such examples are not rare. M. Bally has seen the Cholera decidedly complicated with a case of yellow fever; and our colleague Dr. Jackson had previously described a Choleric yellow fever, of which he has given the symptomatology, the anatomical characters, and the treatment. Torti, and other observers, since his time, have treated the predominant and violent symptoms of Cholera in irregular (ataxic) remittent fevers.

It is consequently well established that the Cholera has been, from time immemorial, observed in the sporadic state, in the catastatic state, in the endemic state, in the symptomatic state, and that, in these different conditions, it is never propagated beyond the circumstances which attended upon its origin.

Let us deliberate upon this first order of facts, and again let us recapitulate, and with design, those general results which have been drawn from incontestable observation and irresistible evidence. Clinical instructions show us the manifestations of

the isolated, sporadic Cholera, in individuals exposed to the causes capable of producing it. Every physician has seen examples of it, provided his practice has placed him in the midst of circumstances more or less capable of giving rise to similar symptoms.

We can quite as easily conceive the facts of Cholera existing in a certain number of cases at determinate epochs of the year, through the influence of constitutions of the seasons and of confined medical constitutions. There are few countries in which clinical observation has not detected the *catastatic* form of Cholera.

We can also readily conceive that, under the influence of certain climates, from the effect of particular drinks and aliments, and in consequence of determinate localities, the Cholera exists in the endemic state:—the East Indies, since they have been medically investigated, are an incontestable proof of it.

Finally, facts have also presented themselves, which compel us to admit that the Cholera, with all the characters which are peculiar to it, manifests itself symptomatically in some cases of malignant fever, and that it does not extend beyond these individualities, with which it is closely connected.

There is then no absolute, natural, necessary, inevitable property in Cholera, of extending from one individual to another. The Cholera is not then,

by its nature, essentially, primitively transmissible, since it has very manifestly been observed in all ages, and by all physicians, in the sporadic state, the catastatic state, the endemic state, and the symptomatic state, without ever having passed beyond the limits assigned to the particular causes which have thus been shown to originate it.

Should the other scholastic divisions of Cholera detain us even an instant? Eminently practical geniuses, Hoffman and Frank especially, have already done justice to them. As for us, we write under circumstances too serious, to lay any stress upon these speculative subtleties.

But the Cholera reigning in great epidemics, in spreading and devastating epidemics, by the effect of circumstances which cannot be rigorously appreciated or understood, from the action of occult causes which can neither be controlled nor foreseen, independently of special conditions and physical individualities, unconnected with atmospherical vicissitudes and the modification of seasons which give rise to it, exclusively of the local peculiarities and hygienic influences which produce it, remote from acute diseases and those febrile conditions with which it is connected; the Cholera thus produced has not hitherto been presented to medical investigation; and it is precisely in this state that we are called upon this day to devote to it our most diligent attention.

# PART FIRST.

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## SYMPTOMATOLOGY.

The Cholera in its violent epidemic form has, for nearly fifteen years, exercised its fatal ravages upon the scarcely explored soil of upper India; and for about three years has sought to place its foot upon our ancient Europe.

Two different, we might even say opposite, theatres, are, thus almost simultaneously opened to this fatal epidemic: the one is the burning soil of the principal districts of the peninsula of India; and the other, several governments of the Russian Empire, and several parts of northern Europe. Let us examine the disease successively upon both of these theatres.

Upon the continent of Asia, the Cholera has presented the following characters:

General uneasiness, accompanied by a painful sensation of heat in the epigastrium; weariness of the extremities; greater or less debility; oppression; the physiognomy of the patient, which at first expressed only uneasiness, changes more or less rapidly, according to circumstances, to the ex-

pression of great anxiety ; at this moment the pulse is quick, but hard and contracted.

This is the period of invasion of the disease, a period observed by many practitioners, Annesley, Colledge, &c. ; disputed on the other hand by Scott and some other authors.

Now, let us say in anticipation, that Dr. Annesley attaches to this period so much the more importance, inasmuch as, according to him, it is chiefly by acting precisely at this instant that the assistance of art fortunately succeeds in arresting the disease, by stifling it in its work of formation, or at least by preparing it for a successful termination.

The primary symptoms are sometimes accompanied, or at least immediately followed, by a very severe pain at the pit of the stomach, which soon invades the entire digestive tube: this is, of all symptoms, the most durable and the most constant, and is one of the characteristic signs of the disease.

Next, repeated vomitings supervene, the stools become frequent, attended with a painful sensation of prostration, exhaustion, and as it were of general vacuity. Irregular spasmodic contractions, violent cramps, seize upon the superior and inferior extremities, which, together with the fatigue produced by the repeated vomitings and frequent dejections, cruelly torture the patient.

The evacuations, exclusively composed at first of the substances contained in the stomach and intestines at the invasion of the disease, soon assume a particular pathognomonic character; they consist of a whitish, serous, aqueous fluid, somewhat analogous to a decoction of rice mixed with albuminous flakes, or to the liquid evacuated by the operation of paracentesis: sometimes these substances are still thicker, muddy, and interspersed with diverse grey and greenish colours, but rarely bloody. Occasionally the alvine dejections are forcibly expelled from the intestines, and as it were by the jet of a syringe, even in an advanced period of the disease.

There is an absence of febrile re-action; the pulse is small, vacillating irregular, nervous; it rather vibrates than beats. This absence of all re-action, even though it may be only a negative symptom, is one of the most decided characteristics of this disease. Except in very rare cases of accidental complication, the equally uncommon cases of typhoid terminations or mutations, or those in which the tendency to cure manifests itself and persists a greater or less length of time, never, in this period, has any severe symptom of the choleric epidemic assumed the febrile form unless the disease terminatied favourably.

The flow of urine is entirely suspended; the secretion of it does not go on at all; necroscopic observations unite with the symptomatology to prove the complete vacuity of the bladder.

The spasms rapidly assume a greater degree of intensity; they successively, and in a very short period, run through the inferior and superior extremities, the abdominal muscles, and, in the last place, the thoracic and diaphragmatic muscles; but they rarely extend to the muscles of the back, face, or loins. These spasms are rather of the clonic than of the tonic character.

Then also supervene deafness, giddiness, tinkling in the ears, and coldness of the whole body. A great anxiety at the precordial region manifests itself; it is connected with an extreme difficulty of breathing, and excessive debility of the whole system. The air expired by the patient is destitute of all warmth. The skin is covered with a cold sweat; and this cold, this humidity, sometimes augments to such a degree, that the dermis is corrugated and folded as if the skin had been macerated for a long time in warm water, or covered by an emollient cataplasm.

In many cases, the skin, throughout its whole extent, or in certain points, assumes a leaden, bluish, and livid tint.

The sunken countenance; the deep, hollow eye, surrounded by a livid circle, and the pinched features; all give to the patient a ghastly appearance. According to the saying of almost all observers, the face of cholerics, differing but little from the hippocratic face, is so highly characteristic, that this sign would of itself suffice for the diagnosis of the disease. The face is triangular, says Dr. Blahodatoff, who observed the disease in the district of Samarski, government of Orenburgh.

The pulse is contracted, small to excess, it is difficult to seize it, and frequently the pulsations at the wrist are wanting; they are even scarcely perceptible at the heart. At this period, the blood, which a little time previous was oily, thick, black, and escaped but with difficulty from the vein, can no longer escape from it, or at least is expressed from it with difficulty.

The patient experiences an insatiable thirst, he swallows with avidity cool liquids; notwithstanding the tongue and mouth are pale, white, moist and cold. The voice is feeble and sepulchral. There are vague jactitations of which the patient is scarcely conscious; and though he may retain the integrity of his intellectual faculties, all the vital actions are in such a state of exhaustion, that he lies in complete unconsciousness of his condition, and obstinately wishes to remain at rest, totally indifferent to what is doing

for his relief, and to every thing that is passing around him. Death generally happens in twelve, fifteen, twenty or twenty-six hours after the invasion of cholera. Often, towards the close of the disease, and at the approach of the most imminent danger, the vomitings and dejections diminish, become suspended, and cease suddenly.

The commencement of the disease generally takes place during the night or in the morning; the other periods arrive with rapidity, and often with confusion—for we must not expect any thing fixed, any thing regular, in the midst of this scene of disorder and destruction. In a great number of cases, all the stages of the disease become confounded and exhausted in a very short space of time. One or two hours, at most, sometimes intervene between the violent invasion of the disease and its fatal termination.

The course and series in which the symptoms are unfolded, connected, and succeed one another, are sufficiently variable: sometimes even the most prominent and most characteristic symptoms are entirely wanting, and that doubtless because they have not been allowed time to develope themselves: such, for example, are the vomitings. We find some cases in which the disease has progressed so rapidly, that in an instant the individual is found transported from the state of perfect health

to that fatal epoch when the vomitings and stools cease, because all the vital operations, all the involuntary movements, abandon the life which is soon to cease and be extinct.

The symptoms in natives and Europeans are the same. The constitution of the individual makes all the difference, according as, whether naturally or accidentally, he is found, in the moral as in the physical, either vigorously constituted, or considerably debilitated.

By analysis, the catalogue of the symptoms of the disease may be thus summed up :—

Epigastric pains, repeated vomitings, and frequent stools ; the substances, discharged at first, consisting of aliment recently ingested, soon become fluid, whitish, and flocculent ; violent cramps in the superior and inferior extremities ; coldness of the body ; suppression of urine ; the skin of the extremities, of the feet especially, pale, moist, cold and wrinkled ; decomposition of the features ; hippocratic countenance ; sinking and notable disappearance of the pulse.

Investigated in its symptomatology, the medical history of the epidemic cholera has acquired but little in the hands of the physicians of Russia. In Russia and in India the disease has presented itself under the same characters ; upon both theatres nature has been faithfully copied. Why then should not their descriptions bear a resemblance ? The epidemic influence acting upon almost every indi-

vidual exposed to it, even in those in whom the cholera was not realised[1]; the period of imminence marked, although rapidly, in many patients; the choleric physiognomy given as one of the prominent characters of the epidemic; the absence of all febrile re-action; the frequency of relapses: every circumstance noted by the English physicians in India, has been exactly presented to the view of physicians who observed the disease in Russia.

Here, however, we observe, in a special manner, that the cramps manifested themselves in a more violent and obstinate form in women than in men; and still more so among those who possessed a feeble constitution, who were subject to hysterical affections, or placed under the influence of pregnancy, whether in its commencement or its more advanced stages.

The pulsations of the heart diminished to that degree, that, even by the ear or the stethoscope, its motion could scarcely be distinguished; and in the most severe cases, it was only the left side of the heart that continued to contract slightly; the pulse then disappeared entirely, and could but with difficulty be detected except in the carotids. In certain cases, says M. Jachnichen, it was only by means of the stethoscope that the respiratory movements could be followed. In Russia the stools and vomiting were less frequent and abundant.

In Poland, the symptomatology the same; here only percussion has revealed to MM. Brière de

Boismont and Legallois a symptom which had not been so clearly mentioned until then; it is the dulness in the sound (*matité*) of the abdomen. This phenomenon, say our observers, is particularly remarkable, when we compare it with the sonorousness of the belly in individuals attacked with typhus. This dulness is explained, they add, by the enormous accumulation of fluids in the intestines. At Madras, this state of the abdomen had also been pointed out by Annesley.

By the side of the symptomatology observed first in India, then in Moscow, and finally at Warsaw, let us place the symptomatology described by Aretœus of Cappadocia; let us translate it throughout; and let us not fail, through the puerile apprehension of being prolix, to be complete and convincing.

In the cholera, an extremely acute disease, says Aretœus, the whole of the alimentary tube experiences a commencement of repulsion, so that the substances collected in the stomach are violently ejected by vomiting, and those of the intestines forcibly expelled from the anus. The matters ejected become liquid and whitish, and those which escape by the fundament are fœtid, pituitous, and sometimes bilious. Soon abdominal tension, pains at the pit of the stomach, and violent cholics supervene. General spasms manifest themselves, painful

contractions in the muscles of the legs and arms ensue ; the fingers are curved, and the nails become livid and extremely cold. There are syncope, vertigo, oppression and hiccup. The urine no longer flows ; the voice is extinguished ; the pulse becomes extremely small and slow, and the patient dies overwhelmed with lacerating pains, and in the midst of the most horrible convulsions.

From these conjoined documents on the subject of the symptomatology of cholera, the following conclusions naturally proceed :

1. The cholera has been observed at all times, in the sporadic state, in the catastatic state, in the endemic state, and in the symptomatic state, without ever having extended beyond the limits assigned to the particular conditions in which they have been found to arise and terminate.

2. The epidemic cholera observed in India is little else than the cholera described by the ancients, as to the symptomatology.

3. The cholera which prevailed in Moscow is the same as the cholera of India.

4. The cholera which has occasioned such ravages in Poland, and especially in Warsaw, does not differ from the cholera which raged at Moscow.

Consequently the cholera of the ancients, the cholera of India, the cholera of Moscow, and the cholera of Warsaw, are identical, so far as regards the phenomenal characters.

# PART SECOND.

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## NECROSCOPIC CHARACTERS.

It is truly remarkable, as we have just seen, how great is the analogy, agreement, and as it were, identity, which the numerous descriptions of the Cholera, derived from the midst of these different regions, present. In Asia, Persia, Syria, in lower Bengal, Mysore, and upon the Coromandel coast, in Russia and in Poland; in the authentic reports of the medical societies of Bombay, Calcutta, Madras, of Moscow and of Warsaw; in the publications of Annesley, Ainslie, Christie, Scott, Convell, Johnson, Jameson, Searle, Reymann, Loder, Moran, Jachnichen, of Delaunay, MM. Brière de Boismont and Legallois: whether we meditate upon its particular histories, or read the general decriptions, always, every where and in all authors, the symptomatology is concurrent and uniform: we might, it would seem, from this consideration alone deduce one of the arguments in favour of the certainty of medicine.

It would be well, indeed, if the same result could be obtained from the history of its necros-

copic characters. Whether, in consequence of the nature of the researches, it was necessary to surmount greater obstacles, or that habit and ability, zeal, and courage, have been wanting to observers, or that pre-conceived opinions often preside over this part of the subject, or that, lastly, the cadaveric lesions have been variable and uncertain; it has always been the case that, upon this point, the detail of facts and the summary of the investigations have often been different, and sometimes even contradictory.

In investigating this order of the subject, there is one consideration which strikes the reflecting reader; it is, on the one hand, the great diversity and even absolute discrepancy which the results furnished by pathological anatomy present, when we compare those of one observer with those of another; and, on the other hand, the resemblance, or even uniformity, of these same results in all the particular cases related by one and the same observer. This is carried so far, that Annesley, who without contradiction, has given one of the best descriptions of this disease, after having subjoined to some of his cases the pathologico-anatomical researches which appertained to them, discontinues the further detail of autopsic examinations, contenting himself with declaring, that the anatomical appearances were the same as in the preceding cases.

With these reflections, which may be subservient in estimating the value of the works we are about to examine, we may say in general that, on the continent of Asia, the researches of pathological anatomy have presented, sometimes the alterations, the anatomical characters of gastro-intestinal phlegmasia, and sometimes a simple catarrhal state without any trace of inflammation of the mucous membrane of the intestines. In some cases cerebral congestions and considerable injections of the vessels of the brain and its membranes have been noted; in others, lesions of the spinal marrow and its envelopes. In many circumstances pathological anatomy has developed nothing which could afford a sufficient reason for the symptoms of the disease and its termination; and then it has almost always been attributed to a lesion of the vital properties of the nervous system.

Let us enter, however, into the details of these researches; it is the only way in which we can comprehend and duly appreciate them.

Doctor Annesley finds, from autopsic investigation that the intestines present a vermillion colour, which, he says, is peculiar to the disease, and which he considers as characteristic of Cholera.

He attributes the same importance to a gelatinous extravasation, to a yellowish, pultaceous, and as it were creamy, matter, which adheres to seve-

ral points of the internal surface of the small intestines, and which is there met with in variable quantities.

According to him, the substance of the heart is softer and more easily lacerated than it generally is in bodies dead from other diseases. The cavities of this organ, as well as the principal arterial and venous truncks, are filled with a thick and viscid black blood.

The primary and principal strokes of the disease are directed, says Mr. Annesley, upon the nervous system, the lesion of which immediately re-acts upon the sanguineous system.

Doctor Alexander Gordon, a surgeon attached to the Bombay Presidency, a man of distinguished merit, and who fell a victim to the epidemic, asserts in a memoir addressed to the medical society of Bombay that, in this epidemic, the lesions of the brain were primitive and essential, whilst those of the intestines were only secondary. In the first subjects which he examined, he had neglected to examine the brain, and then he could not discover any thing which could satisfactorily account for the violent nature of the disease. Afterwards he extended his investigations also to the encephalon, and he there found the vessels injected and the membranes thickened: these lesions, however, did not seem to him to be at all inflammatory.

Doctor Scott, secretary to the Medical Board of the Presidency of Madras, regards these lesions of the brain, on the contrary, as secondary and accessory, since the intellectual faculties generally remain perfect during the course of the disease. In the opinion of Dr. Scott, it is in the mucous membrane of the intestines that the important facts of pathological anatomy peculiar to the cholera are developed. That if the patient is seized with coma, if we observe in him that extreme degree of torpor, into which individuals attacked by this disease fall, if he is entirely unconscious of whatever is passing around him—it is to debility, says Dr. Scott, that we must attribute these symptoms.

Kennedy, the author of a work *ex professo*, upon the Indian Cholera, pretends that this disease consisting merely in a considerable alteration of the vital functions of the nerves, the system of the circulation is but secondarily affected. There is in the Cholera, according to his views, some occult cause which retains the vital powers in a state of violent oppression; in a word, says he, the Cholera consists in a more or less forcible concussion of the encephalon, a concussion, the form of which is entirely unknown to us.

The information derived from the autopsic examinations of those physicians who observed the Cholera at Samarang, sheds no light upon the

the nature of this disease. It is scarcely worth while to make mention of the very slight traces of inflammation scattered over the intestines, and still less do we deem it necessary to notice the bloody froth with which the bronchia were filled in many cases, the contraction and vacuity of the bladder, or the injected vessels of the brain and its membranes. The physicians who have studied the disease in Samarang, have consequently inferred, that, as to its primary cause, it consists in a violent spasmodic affection of the digestive organs, and more especially of the stomach and duodenum.

M. Mouet, surgeon-general of the 24th regiment of his Britannic Majesty, and who has given, in the collection of the Philosophico-Medical Society of Calcutta, a very valuable work on the Cholera, declares that most frequently the opening of bodies does not furnish any information of importance. Sometimes, says he, we found, either in the intestines, or in the encephalon, the vessels considerably injected; at other times such injections scarcely existed, or even were not at all perceptible. In two cases, in particular, wherein the patients were attacked with coma and violent delirium, he found nothing in the brain, notwithstanding, he adds, the autopsy was always conducted with the most scrupulous exactness. It was in three subjects only that he discovered the pultaceous matter which

Doctor Annesley was the first to notice in this disease, a matter which he says is constant, and which he regards as the specific cause and consequently as the pathognomonic sign of Cholera.

Dr. Turnbull Christie, attached to the Medical establishment of Madras, and quite recently appointed to take charge of the civil medical department for the district south of Maratta, in an original and valuable work, entitled *Observations on the nature and treatment of the Cholera, and the manner in which it affects the mucous membranes*, has freely investigated its pathological anatomy. His observations, collected during ten consecutive years and especially in those of 1823 and 1824, as well upon the soldiers of his Britannic Majesty's regiments as upon the natives of cities and country villages, and the frequent opportunities which he has had of seeing the disease in prisons, have favoured him with facilities of opening numerous dead bodies, which are but with great difficulty obtained among the free natives. During the year of 1826 alone the total number of deaths in the whole district of Darwar, amounted to three thousand and fifty-three. We have not, however, any data upon the fixed population of this district.

The mucous system, according to the opinion of Doctor Christie, is the incontestable seat of the disease. This system, an exception to all others, is

susceptible of two forms of lesion: the inflammatory form, which is common to it with all the other tissues, and the catarrhal, which is peculiar to it alone. The catarrhal form is entirely distinct from the inflammatory. In the mucous tissue they generally exist separately, but often they are also united and complicated with one another. The catarrhal form, by being prolonged with a certain degree of activity, ushers in the developement of the inflammatory form. These results of facts are illustrated by the symptomatology compared with that of many other diseases, by the action of medicines on man and animals, and by direct experiments made upon the latter, as well as from certain vivisections. The inflammatory state of the mucous tissue does not differ from what takes place in inflammation in general; but the catarrhal state is a specific diseased affection of the secretory apparatus of the mucous membranes, whence result the augmentation and alteration of the secretion. Then the mucous membrane is white without pain, without tumefaction; there is a diminution in the propulsion of the blood to the circumference. It is pretty generally advanced, says Dr. Christie, that, in the Cholera, pathological anatomy unfolds nothing which can satisfactorily account for the disorders which exist during life. An opinion like this, he adds, can only proceed from the carelessness of the

researches. The mucous membranes have not been studied with sufficient attention: some physicians have, doubtless, examined with care the secretions furnished by the mucous system; but there are few, or indeed none, who have properly studied the lesions of the membranes which furnish these secretions.

It is in vain that we search in the encephalon, the nervous system, or in the sanguineous system for the anatomical lesions of Cholera: it is invariably to the mucous system that these lesions belong; all others are merely accidental or secondary.

I have constantly found, again says M. Christie, in my very numerous dissections, an opaque, viscid, whitish substance adhering to the surface of the intestinal mucous membranes; and in some cases this substance was so abundant as to fill the intestines completely. The membrane was white and smooth throughout its whole extent. Similar alterations have sometimes existed in the pulmonary mucous membrane, and even in the bladder.

The anatomical lesions which, in regard to frequency, may be ranked in the second order, are,

1st, Venous congestions of several organs, and especially of the abdominal viscera;

2d, Accumulations of thick, black blood in all the vessels, and especially in the heart;

3d, Traces of injections upon some points of the

mucous membranes, and especially of the intestines. In these cases the inflammation, when it did exist was found confined to the pyloric extremity of the stomach and the small intestines.

4th. Simple venous congestions in various points, such as have been noticed by Doctor Annesley.

Resuming the consideration of the secretions ot the mucous membrane, Dr. Christie demonstrates that they are not only increased in quantity, but that they are likewise altered and depraved in quality; and brings forward a great number of chymical analyses and physical experiments to substantiate the fact. The author has especially very positively proved that no free acid exists in the substance of these secretions; thus, says he, does the opinion promulgated by Dr. Ainslie upon the pathogeny of the epidemic cholera fall to the ground.

Whitelaw Ainslie has resided during thirty years at Madras and in several parts of southern India, in the capacity of physician and member of the committee deputed to investigate the epidemic cholera. He considers the lesions indicated by pathological anatomy as of but trivial importance; he knows them all, he has seen them all. The essence of the disease, in his opinion, resides in a free acid the existence of which he has detected in the substances discharged by stool and by vomiting; and hence he derives all his opinions relative to the na-

ture of the disease, its indications and its method of treatment.

James Boyle, from three autopsic examinations only, signalizes slight traces of inflammation in the stomach and intestines; he lays great stress upon this order of considerations, and roundly asserts that the pathological anatomy of cholera always furnishes similar results.

At the isle Saint-Maurice, M. Guillemau thus renders an account of his necroscopic observations. It is to the interesting work of our colleague M. Keraudren that we are indebted for this communication.

Encephalon healthy; lungs in the normal state; right cavity of the heart full of a blackish blood, left cavity empty: the stomach presenting diverse alterations; phlogosis and injection of the vessels; the mucous membrane sometimes destroyed in different points and especially near its orifices, which are sometimes apparently contracted: this organ had preserved its liquids almost unchanged. The small intestines were in general healthy, whilst the tunics of the large intestines were thickened. The latter phenomena presented the greater intensity in proportion as the disease had been the more prolonged.

Doctor Labrousse thus gives the result of the autopsic examination of twelve blacks, all of whom

died, in the space of twelve hours, from the epidemic of the isle of Bourbon.

After death, the body, without any appearance of putrefaction, was generally emaciated, very meagre, notwithstanding the constitution of the patients had been very robust.

In some the brain had undergone no change; whilst in others its substance was found softer than in the ordinary state. The longitudinal sinus was gorged with blood, and the lateral ventricles contained a small quantity of sanguineous serosity.

The lungs were sound; the pericardium contained a little serum; the heart was slightly enlarged; the coronary vessels were always filled with a very black and coagulated blood: no adhesion was observed in this cavity.

The gastro-colic epiploon, and the internal surface of the intestines as well as the mesentery, presented a slight degree of inflammation and a great repletion of their vessels.

The gall bladder, very much distended, contained a thick and blackish bile. The hepatic, cystic and choledic ducts were twice their natural size; the spleen, pancreas and kidneys presented nothing peculiar. The bladder was greatly contracted and in a state of complete vacuity. The stomach, distended with gas, was otherwise empty in several; in others it contained a greyish white viscid fluid

and some worms. The gastro-intestinal mucous membrane, sound in some individuals, presented in others an intense inflammation which increased from the pylorus to the rectum. The other tunics participated in this inflammation, with the exception of those of the jejunum and ileum.

Their cavity enclosed a sero-purulent liquid and somctimes lumbrici.

The examination of the bodies of ten other blacks, who died in the first four days of the disease, presented nearly the same phenomena in the three cavities, unless it was that the inflammation was more intense. Gangrenous spots were then observed in the small intestines, and the substances contained in their cavity seemed to be the same with those of the dejections.

Under certain circumstances, the examinations of the bodies of those who have died in consequence of cholera, have exhibited invaginations of the intestines, partial ulcerations and even gangrene. But these can only be considered as accidental occurrences and exceptions; they should be noticed however in order that our researches may be rendered complete; but it should be mentioned that these lesions have rarely been detected, and that it is not in the most severe and most promptly fatal cases that they have been remarked.

From the observations of writers on the Indian cholera, two original opinions, in relation to its pathological anatomy, are derived which merit a particular examination.

The first, represented by Annesley, who if he did not discover it has at least supported it with eclat, is characterised by making the cholera consist in a coloration of the intestines, the tint of which varies from a bright vermillion to a deep purple, and in the secretion of a whitish, viscid, and opaque pultaceous matter. This coloration is particularly remarkable upon the peritoneal surface of the duodenum and jejunum. What need is there of insisting much on this coloration? On the one hand, it is necessary that the existence of these reddish appearances should have been confirmed by every observer; a great many, however, have denied their existence; and, on the other hand, in how many cases of different acute diseases have these reddish appearances, these injections not been observed? This lace-work of small injected vessels is almost always discovered after death, especially when but a very short space of time elapses between the decease and the opening of the body. How can any transient red appearances, or partial injections of the intestinal mucous membrane, so little in relation with the general symptomatology, the rapid progress, and fatal termination of the disease,

be seriously invoked as causes of the epidemic cholera ?

The second original opinion, among physicians who have attended the disease in Asia, appertains almost exclusively to Doctor Christie. In the opinion of this physician, the mucous system is the principal seat of epidemic Cholera, and it is a catarrhal state of this system which constitutes the special modification of it: this modification is, in its turn, nothing else than the increased and vitiated action of the secretory vessels of the mucous membrane, and an extraordinary alteration in the secretion. Dr. Christie has almost uniformly found the mucous membrane of the intestines pale, white, softened, doughy, very lacerable, and coated with a large quanity of a whitish, viscid, opaque, creamy fluid.

These facts, which in themselves are of the highest importance, and which have been likewise confirmed by many observers, are nevertheless presented in a manner too general, too exclusive, by Doctor Christie. Without doubt these conditions of the mucous system exist in many cases of Cholera, but they are not in themselves alone the entire disease. In the normal state, the intestinal mucous membrane is also pale, white and soft ; the only difference then is in degree, and this softening of the internal mucous tunic is far from constantly presenting itself in the autopsic examinations con-

sequent upon Cholera. The mucous follicles, the glands of Peyer and Brunner, specially destined for the secretion of the intestinal mucous fluids, are without any material lesion in the Cholera, notwithstanding their functions have been manifestly impaired. In the catarrhal state the occurrences which take place are decidedly opposed to those which ensue in consequence of the inflammatory state of the latter organs.

From the labours of Christie, it appears that the existence of a catarrhal affection, as an integral part of the Cholera, cannot be doubted; but on the other hand, this opinion, entirely exclusive, cannot be admitted as such.

The history of the necroscopic characters has not been less elaborated by the physicians who have engaged the epidemic upon the soil of Russia. In the numerous documents which have reached us from this country we find, in the first place, many of the general results of autopsic examinations; and these results, variable, uncertain and superficial, do not present any character which has not been developed in the researches of pathological anatomy, consequent upon some other diseases; none of which can enlighten us as to the nature of the disease, or unveil to us the cause of its rapid march and fatal terminations.

Let us see how M. Surgeon Major Sokolow expresses himself upon this point, in his interesting work on the epidemic observed at Orenburg.

All anatomical researches made upon the bodies of those who have fallen victims to the Cholera, whether at the commencement of the epidemic or towards its close, and repeated as often as any peculiarities in the symptoms or unusual violence and rapidity in the disease served to attract attention; may be reduced to the following particulars: tension of the skin; flexibility of the muscles, at least during the twenty-four hours immediately succeeding death; a certain flaccidity, a softness of the muscles, and rapid tendency of the bodies to putrefaction.

In the cavity of the cranium, we uniformly found a great collection of thick black blood, extravasated between the convolutions of the cerebral substance, and a distension, a repletion both of the veins of the brain itself and of the arachnoid.

The lungs were flaccid and filled with a thick and black blood; such was also the appearance of the heart, which in some cases presented, internally, polypiform concretions. This last character was particularly remarked in the bodies of those individuals who died, after the termination of Cholera, of lethargic fever with stupor. The abdomen never presented adhesions, extravasation or meteorism. The

peritoneum, mesentery, and omenta preserved their normal state; their blood-vessels however were more distended with blood than ordinarily. The stomach and intestines presented, as well at their internal as upon their external surface, reddish streaks, similar to inflamed scratches, which extended longitudinally. Internally, the intestines were covered with brownish and pretty viscid mucosities. After having washed away these mucosities, we perceived that the thick reddish streaks of the stomach and intestinal canal, and especially of the small intestines, presented neither gangrenous appearance, nor that purplish redness which characterises a decided inflammation. Injections of thick blood were particularly manifest in the venous ramifications of the stomach and liver; the gall-bladder was injected and filled with a considerable quantity of bile. The spleen was sometimes healthy, but more generally turgid and very lacerable. The kidneys differed but little from the natural state; the bladder was always empty and contracted. We have not in any corpse found the least trace of gangrene.

Doctor Meusnier, Physician of the Faculty of Paris, Consular Agent of France at Tangaroc, where he has observed the disease, in his letter to the Academy upon the Cholera, thus expresses himself:

" The disease is decidedly an inflammatory epidemic; the necropsy has exhibited (especially

in those who perished rapidly) very violent inflammation of the epiploon, of the small intestine, and of some parts of the stomach ; the gall-bladder but partially distended, and usually containing a deep-coloured and thick bile ; a deep coloration of the muscles in all their fibres, a coloration which I have never seen so strongly marked in other cases of necropsy, consequent to death proceeding from other diseases."

Doctors Jachnichen and Marcus have published a collection of forty cases of Cholera, followed by autopsic examinations carefully made and exposed with the minutest details. Let us first hear M. Marcus' description of these researches in pathological anatomy.

We have found, says M. Marcus, that a black blood filled not only the cavities of the heart, but also many of the arteries, especially the arteries proper to the heart and those of the base of the encephalon ; besides, there were constantly certain fibrous polypous concretions in the cavities of the heart, and also some signs of irritation and apparent inflammation over points of this organ.

We have also directed our attention to the pathological state of the envelopes of the spinal marrow and of the coverings of the brain, the whole of the medullary substance of which was found healthy, and we have seen that the first were more frequent-

ly in a pathological state than the second. Lastly, we have found that the intestinal tube not only did not present uniform characters, but that it even presented those which were contradictory.

We have been led to conclude that the alterations in the gastro-intestinal system have only been consecutive and accidental; that those of the encephalon, although much more important, were not however characterised by a disturbance of functions by any means so great as that which obstructed the movement of the heart during life; that, consequently, the phenomena presented by the heart, such as the accumulation of a black blood in its cavities and in the arteries, together with the fibrous concretions, were the most constant anatomical characters.

The stomach and intestines, says MM. Brière de Boismont and Legallois, contained a considerable quantity of a whitish serous fluid. After the escape of this fluid, we found the mucous membrane generally coated with a white, creamy substance: the thickness of the intestinal tunics was sensibly augmented, and they gave under the fingers a clammy sensation; they were of a remarkable whiteness, and presented only a slight linear injection, occupying the most dependent portion of the intestine. In certain cases, the digestive canal did not enclose any serosities; but it was almost every where lined with a faded white matter, opake, viscid and adherent to

the membranes. The latter were sometimes of an extraordinary whiteness, at other times highly injected. Sometimes the white matter was also found in the bladder, but in variable quantity. In general, the spleen was small, the liver healthy and the gall-bladder moderately distended with a thick deep-coloured bile. The other organs presented nothing peculiar.

The works on the pathological anatomy of Epidemic Cholera, published in Russia, considered in relation to the original or new data which they present, reduce themselves, as we perceive, thus far, to the four decadal publications of M. Marcus and his colleagues.

These forty cases, all of which are followed by autopsic examinations, carefully performed and minutely detailed, are so much the more entitled to particular attention, inasmuch as being collected by three, four or five physicians, these facts are presented with a degree of authenticity which many of the others do not possess.

To recapitulate. These forty cases present two circumstances which would at first sight seem to deserve examination. These are:—

1st. Deep spots, resembling ecchymoses, upon the external surface of the heart and at its posterior part; the different cavities of the heart, and the large trunks which proceed from it containing, in

all the cases, a great quantity of gelatiniform or even polypiform blood:

2d. Considerable injections of the dura mater, and sometimes also of the pia mater; the brain dotted with blood, and the spine, in some cases, containing a certain quantity of sanguinolent serosity; the pia mater most usually injected to a remarkable degree; the spinal marrow softened in several points of its extent.

The accumulation of blood in the heart and large vascular trunks it would seem should first attract attention, and with so much the more propriety, because this fact, in India as well as in Russia, has been noticed by almost every observer. But can this accumulation of blood truly constitute a cadaveric lesion to which we should attribute the epidemic cholera? The blood does not seem to have presented any sensible alteration; and in fine, there has merely been discovered what is observed in all acute diseases when they run rapidly to a mortal termination. This state is, without any doubt, the normal state of the heart and larger vessels, according to the general and most approved notions of pathological anatomy.

And, as it regards those ecchymoses of the external and posterior surface of the heart, what can we say of a lesion which is not found mentioned by any other observer, and which, even in the examinations

made by M. Marcus and his colleagues, were only detected in nine subjects out of forty?

Of all the lesions pointed out by M. Marcus, the most important is, without contradiction, the softening of the spinal marrow, especially as, out of forty facts collected, this softening has been observed nineteen times; and we might say that, if elsewhere, and by other observers, this phenomenon has not been noticed, it is because the researches necessary for ascertaining it were not made, since the spine has but very rarely been opened, and even where it has been, it was seldom with attention and desirable precaution.

On the other hand, however, we may remark that this lesion has only been observed in the moiety, at most, of the subjects opened; that the alteration might be the result of manœuvres employed in order to examine the spine; and that the disease has neither been more violent, more rapid, nor more fatal in those subjects in whom this softening has been discovered, than in those in whom it was not detected. From these different considerations we must naturally deduce the following conclusions:

1st. The various anatomical lesions, observed after death caused by the epidemic Cholera, have nothing exclusive, nothing proper to this disease.

2d. These lesions are not more constant as to their seat than as to their nature.

3d. These lesions have no relation of causation, either with the disease or with the death, in Cholera; they can only be considered as more or less accidental, more or less remote consequences.

4th. Neither the seat nor the nature of epidemic Cholera have derived satisfactory elucidation from pathological anatomy, notwithstanding the researches and endeavours of the great number of enlightened men who have been engaged in them.

If we now turn back to what has been done with regard to the pathological anatomy of Cholera prior to the epidemic of India, we will learn that Celsus, from the symptomatology alone, had predicted the difficulty of assigning a determinate anatomical seat to the Cholera-morbus.

"*Cholera,*" says he, "*inter intestina stomachumque versatur: ita ut, cujus potissimum partis sit, non facile dici queat.*"

We must arrive, however, at the commencement of the seventeenth century in order to meet with concise anatomical annotations upon the peculiar lesion of Cholera.

Diemerbroeck places the seat of Cholera in the gall bladder, which he has found filled and distended with bile.

Dolæus and Bartholin attribute the Cholera to gangrene of the small intestines and pyloric orifice of the stomach. These two anatomists have, moreover, found the stomach and intestines tinged exteriorly a deep yellow colour.

Riolan affirms that the liver is dessicated, and indurated, and that the gall-bladder as well as biliary ducts very much dilated.

Bonetus considers the Cholera as a disease of the liver, when it is not occasioned by poison.

Mons. Portal coincides with the opinions of Bonetus.

Hence it results that the Cholera, so far as relates to its necroscopic character, has received, neither previous to the epidemic of India, nor during this fatal occurrence, nor since, any important elucidation, notwithstanding the numerous works published on this subject, both in Asia and Europe.

Hence, thus far, the epidemic Cholera has no positive, definite, or fixed character; and if it is possible to discover the true seat of this malady, if we may retain the hope of ascertaining its nature, we must seek elsewhere than in pathological anatomy for that information which will enable us to obtain this important result.

## PART THIRD.

### NATURE OF THE DISEASE.

Since, in the endeavour to ascertain the seat and nature of epidemic Cholera by the light of pathological anatomy, we have failed in our object, let us see whether its symptomatology will not serve us as a better guide.

In the first place let us examine that remarkable impression which the epidemic state produces upon the general organization. Every where has this influence been observed. In India, as well as in Russia and Poland, physicians of every opinion have carefully noted it: few individuals escape its action, even of those in whom the symptoms of Cholera have not been realized.

Almost every person residing in countries attacked by the epidemic Cholera complain of spontaneous lassitude, general uneasiness, heaviness of the head, frequent vertigo, and prostration carried even to syncope. Hence we manifestly perceive, in all those individuals who are placed within the sphere of activity of the epidemic influence, the unequivocal indications of a change, of a diminution in the great

function of *innervation*, that is to say, of the vivifying influence of the nervous system upon the other systems, upon the various apparatuses, and upon all the organs of the economy. Such is the capital, essential, and primitive effect of the epidemial agent, since it is exercised upon every individual, whether healthy or diseased, strong or weak, though in variable degrees of intensity. This effect, at the same time constant, positive, manifest, predominates over all others.

To this primary consequence of the diminution of nervous energy, are joined, almost simultaneously, constipation or a slight relax, anorexia, loss of appetite, flatulency, a gentle diarrhœa, in short, a more or less considerable disturbance of the functions of the gastro-intestinal mucous membrane. Thus, on the one hand, diminution of the nervous function; on the other, evident effects of this depression of the nervous energy upon the mucous membranes, which are thereby imperfectly supported, vivified and excited; these are the two primitive effects produced by the epidemic influence. Now, if we bear in mind these two orders of phenomena, the diminution of the nervous function and the direct bearing of this diminution upon the mucous system, we will manifestly have the rudiments, the germ, and, as it were, the diminutive of the disease.

It is not without motive that we would be desirous of dwelling longer on the consideration of this important order: but let us proceed.

When the Cholera is developed, and when the violence of its assault does not break down at once the bonds of the living organism, the symptoms we have mentioned assume greater intensity. Then commences the period of *imminence* of the disease; a period, the premonitory symptoms of which are oppression, weakness of the pulse, discomposure of the countenance, epigastral anxiety, all which symptoms could neither be so rapidly produced nor more naturally explained than by a diminution of the nervous energy, the effects of which are essentially expended upon the digestive apparatus and circulatory system.

After the example of nature, in the course of this disease, let us rapidly run over the disorders and their consequences.

The contractions of the limbs; cramps of the extremities; lypothemias; faintings; sinkings; paleness; the cold and shrivelled condition of the skin; the blue colour of the fingers and nails; the hippocratic countenance occurring in an instant and without any apparent cause; the altogether peculiar and frightfully rapid disappearance of the vital powers, which are broken down, extinct, annihilated, if they can be said to be at all in action when life is no near its termination; but which

on the contrary, considered in existence, are feeble, though excitable, and subsequently become vigorous, as the patient often passes from apparent death to perfect health as rapidly as he had undergone the contrary change. Do not these symptoms manifestly give a just idea of the disease? In fact, where also can be found, but in the reduction of the nervous energy, sufficient cause and complete exposition of these difficulties?

It is because the gastro-intestinal mucous memranes are no longer excited, supported, or stimulated by the influence of the nervous system, that, struck with atony, in consequence of the alteration in the whole ganglionic system, they no longer have any regulated action, and hence the depraved and augmented secretions from these membranes.

In the catarrhal epidemic affections, hitherto described, the catarrhal lesion seldom passes beyond the pulmonary and gastro-intestinal membranes. In Cholera, the catarrhal state is often propagated to all the mucous membranes in the economy.

Several practitioners, Doctor Orton among others, has seen the epidemic Cholera commence with diarrhœa only, and even consist in this symptom alone; the disease otherwise preserving all its rapidity and all its dangers.

It is generally in the form of severe epidemic that catarrhal diseases make their appearance.

The humidity of the conjunctiva, the softness and flaccidity of the tongue, which, in addition, is commonly cold, slimy, and white, the pathological state of the mucous membranes, the marked alteration in the mucous secretion of the stomach and bowels, are incontestable indications of this particular catarrhal state.

Life, purely virtual, scarcely inherent, as if it could no longer suffice for the whole economy and defend itself upon all points, abandons the circumference and recedes towards the centre; it shrinks back upon itself, and becomes concentrated at the interior. Hence we see that there is no more evidence of vital reaction in the circulatory apparatus than elsewhere; the pulse is scarcely perceptible; respiration is inaudible; leeches can no longer extract even one drop of blood; and the largest apertures made in the veins, with the view of bleeding, scarcely permit us to express the smallest quantity of this fluid, which besides is thick, black, and viscid.

The act of formation, the pathogeny of Cholera, as well as the Cholera itself, enlighten our judgment then in the determination of the seat and nature of this disease.

Vomitings;

Dejections;

Matters vomited, resembling a strong decoction of rice;

Matters dejected, aqueous, flocculated, whitish, abounding in mucosities;

The skin, pale, cold, damp, and wrinkled, especially on the hands and feet, as if these parts had been covered by a cataplasm;

The tongue, white, soft, moist and cold, notwithstanding the patient is devoured with an unquenchable thirst;

The mucous membrane, often softened and thickened, and still more frequently covered with a viscid, whitish, opake, creamy substance, which, in certain cases, is so abundant that it obstructs the whole of the intestinal canal;

The genito-urinary mucous membrane and the pulmonary mucous membrane in a similar state; which is never the case in ordinary acute catarrhal diseases, where the alteration is limited to the gastro-intestinal and pulmonary mucous membranes:

Such are the symptoms which incontestably prove the catarrhal state.

Let us now present the characters of the nervous state, which are not less decisive:

1. The epigastral anxiety;
2. The spasms;
3. The contractions of the limbs;
4. The cramps of the extremities;

5. Lypothemiæ;
6. Syncope;
7. The cold breath of the patient;
8. The weakness and, as it were, disappearance of the pulse;
9. The insensibility of the respiration; and
10. The Hippocratic countenance.

Let us now recapitulate this doctrine.

The Cholera, in its diverse periods of duration, in its variable degrees of intensity, is a special, complicated and complex disease, characterized by a great diminution of nervous energy, combined with a particular catarrhal state of the gastro-intestinal mucous membrane.

Either of these two pathological conditions is susceptible of predominating to such an extent as to demand more particularly clinical attention, according as they are dependent upon individual peculiarities of constitution, the different stages of the disease, &c.

The predominance of the catarrhal over the nervous state, and reciprocally, varies especially with the rapid, fugacious, stages of the disease. In the first stage, the symptoms of the nervous affection are those which generally predominate; in the second, the gastro-intestinal catarrhal affection is most prominent. Almost always, however, the two stages unite, combine, and become confounded, and with

them are also mingled and blended the phœnomenal characters of the two pathological states. Such is the disease when exalted to its highest degree of intensity. It requires all the attention, all the sagacity of the enlightened observer, in order to lay hold of these various combinations. It is to the predominance of the nervous affection, towards the advanced stages of the disease, that we must attribute those frequent typhoid transmutations which we observe at the termination of Cholera. Still is it very probable, from a great number of facts, that even the phœnomena of the catarrhal affection are a primary consequence of the diminution of the nervous energy.

Having thus investigated the disease in its period of formation, or in its course from health to disease, let us now examine the inverse period, that is the the transition from disease to health, or the cure, and see what it will teach us.

One of the first indications of cure, in the epidemic Cholera, is the presence of bile in the evacuations by stool and vomiting.

A still more favourable sign, is the restoration of heat to the external surface of the body, and, especially, the cessation of the stupor and spasms in conjunction with these circumstances. If the stupor and spasms increase at the moment the cessation of vomiting and purging supervenes, mistrust the fate of your patient.

The appearance of perspiration is almost always a favourable indication.

The respiration becoming free and easy, the beating of the pulse returning with regularity in the radial artery, the free secretion of urine; such are the changes which generally precede the cure; and it is here especially we would note that the return to health, after an apparent death, is neither less remarkable nor less rapid, than has been, in the inverse direction, the transition from the state of most perfect health to that of the most alarming disease.

In fine, wherever the disease has been observed, it has been constantly noticed that we have reason to augur well of those patients in whom there have appeared certain signs of the definitive cessation of the concentration of the forces at the centre, and in whom, on the other hand, were manifested satisfactory evidences of the proper radiation of the vital powers to the circumference.

Thus then, the manner in which the morbid phenomena are developed and connected, as well as the course in which they are lessened and dissipated, equally tend to prove that the disease consists in the diminution or suspension of the nervous function, combined with a catarrhal lesion of the gastro-intestinal mucous membranes.

Let us exhaust, if possible, this order of considerations, and see whether the treatment which the epidemic Cholera has undergone, can furnish us with useful deductions. The etiological inductions drawn from therapeutic measures are scarcely less useful, or less certain than the curative indications which we deduce from them. It is a just observation, *à juvantibus et lædentibus fit indicatio*, and with equal propriety we might say, *à juvantibus et lædentibus fit dignotio.*

One means of cure pretty generally adopted in epidemic Cholera, is blood-letting: but it should be remarked that, upon all points and in the eyes of all individuals, the bleeding recommended, here especially, from the commencement of the disease, has been clearly and specially denoted by the title revulsive, and is employed as a means of reanimating, or recalling the excentric circulation.

Furthermore, bleeding, which is condemned by a considerable number of skilful practitioners, is adopted by none, unless in cases where the patient is young and of a robust constitution.

M. Noel, in the midst of a pretty extensive epidemic, performed wonders by means of liquid ammonia, given several times a day in an aromatic infusion. M. Deville quickly dissipated the disturbances by the aid of a large dose of ether, administered immediately on the accession of the disease. Every

where opium has been associated with diffusibles, with musk, with camphor, ether, or essence of mint; every where have been prescribed with success tonics, bitters and aromatics. The Russians have particularly extolled vapour baths, warm aromatic applications to the skin, stimulating frictions, &c.

Vesicatories of every kind and in every degree sinapisms, and external cauterizations, are so many means which have in their turn been resorted to.

Quite recently Doctor Leo has endeavoured to prove, from a great number of convincing facts, that the method most constantly efficacious against the cholera, consists in the employment of sufficient doses of the sub-nitrate of Bismuth, one of the most active antispasmodics with which we are acquainted.

Doubtless we have presented enough of these powerful indices to demonstrate that the therapeutic means concur with the analytic symptomatology, in conducting to similar conclusions.

Having stated what the disease is, let us now proproceed, by way of exclusion, to say what it is not. Without contradiction, the epidemic Cholera is not an inflammatory disease; still less is it a particular inflammation of a determinate organ. If the cholera was a gastro-interitis, or a hepatitis, the light of pathological anatomy would certainly have revealed it to us; and even should all the circumstances of the disease not combine to prove that the epidemic

cholera is not essentially inflammatory, would not the total absence of every vital re-action, the frequent want of every febrile movement, in the first stages of the disease, be of themselves sufficient to exclude such an opinion? Let us also add that there never has been observed, in the autopsic examinations of those who have died of epidemic cholera, any of those frequent terminations, common degenerations, or ordinary transformations, which result from inflammatory diseases.

Neither is the epidemic cholera a typhus. The patients retain to the last moment the integrity of their intellectual faculties: conscience, judgment, reason, presence of mind, all remain entire; and fever scarcely presents itself in the simple and so frequent cases of epidemic cholera. There has not been observed in cholera those numerous symptoms of vital re-action which are inseparable from typhus, such as heat of skin, redness and animation of countenance, cough, &c. and never has it been attended with exanthematous eruptions, *sudamina*, or petechiæ.

Finally, as has been very judiciously noted by MM. Brière de Boismont and Légallois, the typhus is most frequently accompanied with a great sonoriety of the abdomen, whilst, in cholera, this part of the body is particularly remarkable for its obtuseness.

Neither does medical analysis permit the reduction or conversion of the epidemic cholera into a simple affection, a mere catarrhal alteration: this would be too great a miscontruction of the remark made upon one of the characters of the mucous system in general and of the gastro-intestinal mucous membrane in particular. The ensemble of the symptoms connected with epidemic cholera, their developement, succession and rapidity, as well as the formidable terminations of the disease, decidedly repel this assertion.

Finally, what judgment can we pass upon the opinion promulgated at Moscow in consequence of the chemical experiments of M. Hermann, by which the epidemic cholera is made to depend upon the deviation of a particular acid, which this chemist pretends to have discovered in the blood in the normal state, in that of persons in good health; an acid which M. Hermann no longer meets with in the blood of choleric patients, but which on the contrary is detected in great abundance in the matters discharged by vomiting and by stool.

Now, in the first place, the symptoms of the disease do not in the least degree coincide with this presumed cause, neither does the treatment, notwithstanding, in a small number of cases, the calcined magnesia has been given with an appearance of success.

But let us attack this opinion on its own ground since we can there oppose it with its own weapons. Numerous and appropriate experiments, repeatedly made by Annesley, have demonstrated most conclusively that the matters of the stools and vomiting contain no free acid.

It is thus that Annesley has satisfactorily refuted the opinion of Dr. Ainslie, who, in India, had also attempted to attribute the epidemic cholera to the existence of a particular acid, contained, according to him, in the matter of the secretions.

And as to the presence of a free acid in the blood in the normal state, this assertion is found contradicted by every satisfactory experiment hitherto presented.

The property which the blood possesses of turning the syrup of violets green has been remarked by chemists of the greatest antiquity; and the experiments of Rouelle, the younger, undertaken with the view of determining the nature of the alkaline salt mentioned by Haller and De Haen, have long since settled beyond a doubt the existence of the sub-carbonate of soda in the blood.

Bucquet, Baumé, Parmentier and Deyeux have since confirmed the results of the experiments of Rouelle. Not only have they proved the presence of an alkaline salt in the blood, but they have also

proved the entire neutrality of the product obtained by its distillation in the balneum maris.

Dr. Marcet, MM. Bestock, Berzelius, Brande, Dumas, Prevost and John of Berlin, in their publications on the blood, all agree in conceding to this liquid the alkaline character.

Finally, if there was any absolute necessity for it, we might cite, in support of this opinion, the results of the recent experiments which Dr. Dennis of Commercy has detailed in his important work on the human blood, and we might also cite those which make the subject of a memoir yet unpublished, to which the Academy has just granted a golden medal.

M. John, in his tables of the chemical analysis of the animal kingdom, translated by M. Robinet, announces, it is true, that Prout has found free acetic acid in the blood; but in consulting the original memoir, volume xxxvi, page 258 of the *Annales de Chimie*, we soon ascertained that the German chemist had fallen into an error. Prout does not certify the presence of free acetic acid in the blood, but the existence of Benzoic acid only, which M. John himself affirms to be combined with the soda.

Doctor Albert, sent by the King of Prussia to Moscow for the purpose of studying the cholera, endeavours to prove that the disease consists in a paralytic affection of the heart. In support of this

opinion he cites the extreme anguish, the oppression, the suffocation with which the patients are seized; and if the circulation, says he, at the circumference is imperfectly carried on, it is because the heart wants energy to propel the blood from the centre to the periphery.

This method of investigating the nature of cholera slightly approximates to the opinion promulgated by us. However, the opinion of Dr. Albert is by far too exclusive, much too positive; by us it particularly appears incomplete, inasmuch as M. Albert has apprehended but one of the fractions of the disease. In the opinion of the Prussian physician the cholera should be classed with the angina paralytodea of certain observers, and surely the phenomenal characteristics of the two diseases are far from bearing a resemblance.

In such an opinion how can we account for the principal symptoms of cholera, for the vomitings, the alvine evacuations, the epigastral pains, the cramps of the extremities, the mucous contents of the intestines, &c. Neither analogy, nor the similitude of cholera and angina paralytodea, could support it.

Several meritorious authors have sought to establish that the primary cause of epidemic cholera resides in a change of relation between the atmospheric electricity and the animal electricity. This

doctrine doubtless is not entirely devoid of facts for its support. Without doubt also it is not unreasonable, neither is it novel to suppose that, in the domain of diseases, in general, the electricity of the atmosphere performs a certain part. But the physical observations, besides being difficult, dangerous even to attempt, and also the clinical comparative observations, being not less easy to collect, are wanting even for the mere discussion of this opinion.

## CONCLUSION.

The critical and exact analysis of the symptoms and necroscopic characters of cholera give this result: that the disease, complex in its nature, consists in a general diminution of nervous energy combined with a particular catarrhal affection of the gastro-intestinal mucous membranes.

## PART FOURTH.

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### PROGNOSIS.

The Cholera-Morbus, abandoned to the resources of nature alone, is almost always mortal. On the contrary, by means of the assistance of art, if dispensed in time and appropriately, this cruel disease is often happily subdued. This remark had already been made by Hoffman; and it is thus that Frank expresses himself upon this point: *Funestus est plerumque Choleræ, sibi ipsi relictæ, exitus : sub artis vero præsidio sat cito concesso, plerique ex illa, quod tanta in alio morbo symptomata vix sperari permitterent, sanantur.*

Similar results of clinical observation have been noticed in every place where the epidemic has reigned.

Two principal considerations arise, as a general prognostic, from the study of this cruel malady.

On the one hand, the physician should not permit himself to be disheartened by the most desperate symptoms—the absolute insensibility of the pulse; the coldness of the tongue; the icy coldness of the precordial region. A great number of particular

cases prove that patients, even in this state, properly taken care of, have been restored to health.

On the other hand, the physician in attendance should never place too much confidence in the favourable symptoms; such security would be fatal. The most encouraging state, in appearance, if the treatment is suspended and the patient left to himself, does not delay to become desperate; such a condition leads to a relapse or to death. It is under the influence of similar conditions that typhoid mutations occur.

The vomiting is incontestably one of the most serious symptoms of this disease; it generally persists for a long time after the dejections and spasms have ceased, and even when the disease assumes a favourable termination, the vomiting, by its obstinacy, fatigues and exhausts the patient, retards the cure and protracts the convalescence.

In general the appearance of bile in the evacuations is a good omen: it is seldom that the cure takes place without the existence of this sign.

As much may be said of the free course of the urine; of the manifestation of halituous sweats; of the diminution of the stupor; of the restoration of the forces; of the cessation of the cramps.

It is especially from the intensity of the symptoms which arise from the derangements of the nervous function, that we must draw our calcula-

tions of the dangers of the disease. The symptoms of the catarrhal state possess but a secondary importance. It has often been observed, after the vomiting and stools have ceased, that the danger has gone on constantly increasing: but then the cramps, the restlessness of the patient, the coldness of the chest and of the epigastric centre, the insensibility of the pulse, went on increasing also.

The rising and frequency of the pulse are in general good signs: these are sometimes observed as the cure approaches.

In a pretty great number of cases, the pulse resumes its natural rythm; sensation and heat spring up in the extremities; the vomiting and diarrhœa cease; yet, however, if by the assistance of art we do not continue every proper effort to support and revive the forces, the disease makes progress, and the patient dies.

In fine, the data upon which the practitioner may legitimately be allowed to predict a favourable issue of the disease, are: the manifestation of fever; fulness of the pulse; restoration of heat to the extremities; the diminution of the avidity for cold drinks; the gradual disappearance of the epigastral anxiety, and of the burning heat at the umbilical region; the cessation of the spasms, vomiting and diarrhœa; the free flow of bile and urine; the improvement of the physiognomy; the return to-

wards the normal state of the aspect and functions of the skin; the respiration easy and regular; the normal heat communicated to the air expired by the patient; the vermillion colour of the lips, tongue, and mouth; animation of the eyes.

The chances of safety increase or diminish according to the physical complexion or moral situation of the patient, and according to the conditions of the public and private hygiene, under the influence of which Cholera patients are found placed.

In India, death occurred more promptly among the natives enfeebled by excess and misery, than among Europeans who lived more regular and better lives.

There are many more chances of safety for individuals of a strong constitution, and for those who have not been debilitated by excesses, by distress and anxiety of mind, or by fear.

Patients accumulated in hospitals or in prisons, placed in encumbered, narrow, low, moist, and impure wards; who groan without attention, without assistance, in the desolation and want attendant on poverty; these are cured with great difficulty.

When the disease is about to be cured, we see the symptoms, even the most characteristic of danger and the most violent, momentarily suspended, and presenting more or less decided intermissions.

The chances of success or reverse, of safety or

destruction, vary according to the periods of the epidemic. The disease is particularly more severe and more frequently mortal at the commencement of the general malady. The reverses greatly diminish, when the period of epidemical augment is found exhausted. At the close of the epidemic, nature is almost sufficient to perform the cure.

The disease often leaves behind it tardy and painful convalescences, from which patients cannot extricate th mselves.

Various statistical calculations have been published with the view of establishing the chances of invasion of the disease and of mortality in the midst of the diverse populations invaded by cholera ; but wherever these calculations have been attempted, the principal data of the problem present so little of fixity and exactitude, that with an appearance of mathematical accuracy, these calculations, for this reason, can only record in a manner more deplorable, the errors which are the inevitable consequence of them.

The evacuations upwards and downwards seem to have been more frequent, more abundant, and more obstinate in Asia than in Europe ; but the physical characters of these evacuations have been every where the same.

The return to health after the first period of the disease, without the patient's passing into the febrile

state, has been much more common in India; and there also the typhoid mutations or terminations have been much less frequent.

The number of patients among physicians and attendants employed in hospitals, compared with the number of patients among the rest of the population, has been more considerable on the European continent than in Asia; it is certain, however, that in general, in hospitals conveniently situated, sufficiently aired and kept properly cleansed, there have been but few victims, even among the physicians and nurses.

The attack when it is not fatal, presents three different issues:

Immediate convalescence, followed only by great debility;

Abundant evacuations of bile voided during several days, sometimes mingled with blood, and attended with particular intestinal pains, and especially with pains in the rectum;

A febrile state, the description of which is faithfully traced in the report from Bengal. The following are its principal features:

The fever which constituted the last period of the disease, presented great analogy with the bilious fevers usually spread abroad in these climates. We could observe the following symptoms: heat and dryness of the skin, tongue very much loaded,

mouth dry, epigastral anxiety, agitation, insomnium, pulse very variable, sometimes stupor, delirium and other symptoms of cerebral affection.

In general, when the disease was disposed to terminate fatally during this period, the tongue, from the colour of cream, became dry, brown, and even black, it also became more loaded; the teeth and lips covered with a fuliginous sordes; the state of the skin varied considerably, shiverings and flashings of heat succeeded alternately; the pulse was accelerated, feeble, fluttering; plaintive moans, hiccup, agitation and oppression supervened; and the patient soon lost all consciousness from the debilitating effects of this nervous fever, and also from frequent alvine evacuations, which were always of a dark colour.

# PART FIFTH.

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## TREATMENT.

What we have learnt from the physicians who have practised in India in relation to the treatment of Cholera, is characterized by a want of precision, indecision, and uncertainty. Here, it is bleeding which reigns over all the other therapeutic means; there, it is opium combined with aromatics, with spirits, and with tonics. In the eyes of the greatest number, calomel given in most exhorbitant doses is the real sheet-anchor. Some have boasted beyond measure of alkalis; others have extolled acids. And unfortunately it is upon preconceived notions, upon the supposed nature of the disease, that these various therapeutic means, always too generally and too exclusively employed, entirely depend.

In meditating attentively upon particular cases, in keeping an exact account of general assertions, we see that patients have been treated by bleeding, yet they sink; that calomel has been administered to them, yet they die; that opium is given to them, yet they equally perish; that these different means are even combined, yet they do not effect their cure. These are serious and melancholy re-

flections, which hereafter, perhaps, may be productive of benefits.

*Bloodletting* is, without contradiction, one of the means which has been most generally advised, one of those upon the efficacy of which the advice and opinions of the physicians of India most frequently agree. To note it at the head of all the others, and to discuss it in the first place, is a duty; for this reason especially, that it is almost exclusively from the period of imminence, from the beginning of the disease, that it is indicated. Still later, in the eyes of some respectable physicians, bleeding is useless and injurious, difficult or impossible. It is not rare, however, to find physicians who proclaim the good effects of bleeding in almost every stage of the disease. These physicians facilitate the escape of the blood from the vein, when it is expressed from it with difficulty, either by plunging the arm in very warm water, or by applying dry or aromatic frictions to this superior extremity, or still further by dipping the arm in a demi-bath, consisting of a very strong infusion of mustard.

But it is particularly at the onset of the disease that bleeding is useful; it is to this epoch that it has been specially assigned by Annesley: and it is hence that Milwood has observed, out of eighty-eight patients bled in season, two only died, whilst he had lost eight out of twelve of those who had not

been bled. The author has not stated at what epoch of the epidemic, nor upon what order of patients, he has noted these facts.

At this period of the disease, the sanguineous emission tends to re-establish the equilibrium of the circulation, which, without it, abandons the periphery in order to concentrate itself about the heart and large vessels; it acts after the manner of diffusible antispasmodics. When the pulse rises after blood-letting, there are great chances of cure, says Dr. Foy, in his letter to our fellow-member M. Bally.

Still later, bleeding has been found mortal by a great number of physicians. M. Annesley, however, cites examples of bloodletting performed at a very advanced stage of the disease, the result of which has also been to recall the circulation to the circumference: in these examples, the blood was at first thick, and merely escaped from the vein *guttatim*, but towards the last it flowed more easily, became more fluid, and assumed a vermillion colour. This, adds this physician, was the result to be desired; no matter whether it happened after the subtraction of ten, twenty, or thirty ounces of blood, even if it occurred as soon as a single ounce was obtained, we might hope for the recovery of the patient.

Let us observe, however, that a great number of patients have sunk after the abstraction of eighteen

or twenty ounces of blood; and, on the other hand many cases of cure have been accomplished under circumstances in which bleeding has not been resorted to.

With respect to bleeding performed when the disease is threatened, (*periode de l'imminence,*) two important remarks present themselves.

Bloodletting, thus considered, is almost always advised in young individuals of a robust constitution, and who are placed in the midst of circumstances most favourable for the cure: it is performed early, and, very probably, upon individuals who, even without this means, would have been but slightly indisposed.

In the second place, it appears certain that, in many cases this means has been, unfortunately, abused, and that with the view of adopting bleeding at the most favourable period, and of making it a preservative against the disease, individuals have been bled who, debilitated by this loss of blood, have thereby been rendered only the more accessible to the epidemical influence, and more cruelly treated by the disease. Perhaps if bloodletting had not been resorted to, they would not have been the subjects of the disease.

*Leeches* have but rarely been employed in Cholera: in the commencement, however, they have been applied for the purpose of diminishing the intensity of the cardialgia. We know, more-

over, that leeches often remain adherent without any secondary effect, and that frequently also they can extract but a few drops of blood.

*Calomel.* Scarcely was there a single physician, during the continuance of the epidemic on the continent of Asia, who did not loudly proclaim the valuable properties of calomel; yet we know what the mortality has been in this part of the globe! Scarcely in the numerous cases of Cholera which we have had occasion to read, can we cite any patients who have not taken calomel; yet, has the issue of the disease been the less fatal? It is true that the physicians and surgeons in India are of the English school; and we are not ignorant that in that country, all obscure, difficult, and dangerous cases, as well as those in which the indication is simple, regular, and manifest, calomel, sometimes in one dose, sometimes in another, always finds its place, with the title of specific, antispasmodic, antiphlogistic, or purgative.

Annesley administers calomel in scruple doses several times a day, with a view of relieving the intestinal mucous membrane of the creamy substance which chokes up and obstructs the intestines. Of all purgatives, calomel, according to this author, is the only one which acts upon this substance, the presence of which is proved in every case of Cholera; and he continues the use of calomel until it is sufficiently apparent in the alvine evacuations. From

three to five scruples of calomel are usually necessary for the accomplishment of this object.

This method of treatment was also that of Doctor Corbin; which the Marquis of Hastings caused to be adopted generally, by putting it in the order of the day of the whole English army.

Doctor Jameson directs calomel as a means of overcoming the spasms of the intestines.

In some cases aloes are combined with the calomel, especially when, from the urgency of the symptoms, it becomes necessary to hasten the appearance of green or yellow bile in the substances voided, an appearancc which is always a favourable omen.

*Opium.* What we have said of calomel, we may equally affirm of opium: patients cured as well as those who have died, all have taken it, and that in conjunction with calomel at first, but also concurrently with aromatics and tinctures of various kinds. It is always the opiacious preparation of Sydenham* to which the preference is given, and we know that in this compound, the opium is found combined with spirituous and aromatic substances.

Let us here bring to mind, that Bontius, who observed the Cholera in India in the catastatic state, or

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* *Tinctura Opii Crocata*, R. Opium 16. Saffron 8. Cinnamon and Cloves āā 1. Spanish Wine 150.—Tr.

that of the minor epidemic in 1669, combated it with great success by means of a preparation which is peculiar to him, and in which the opium is found united with aromatic resinous substances.

Many facts tend to shed suspicions upon the efficacy of opium employed alone: it then too frequently produces a violent determination towards the brain; and in the series of the symptoms of Cholera we observe a great degree of stupor, coma, and sometimes, though very rarely, delirium. These inconveniences have not taken place where the opium has been combined with calomel, camphor, ether, or liquid ammonia.

Mr. Deville surgeon of the French ship *la Seine*, who has seen and attended the epidemic cholera in Bengal, obtained instantaneous relief and even the prompt cessation of all the symptoms of cholera, by the aid of large doses of *Ether*, administered from the first moments of the invasion of the disease. We read in his work a great number of facts in support of this assertion.

*Aromatic infusions*, sometimes aqueous, at other times spirituous, often present themselves among the auxiliaries of the treatment of the cholera in India; we might say the same of *acid drinks* and especially of the tartaric lemonade, which Annesley extolled, and which he did not fear giving cold, as well as all other drinks; which he even prefers ad-

ministering at this temperature, after the example of Galen, of Celsus and Hoffman, notwithstanding the contrary has been advised by almost all physicians who have practised in this country and in the midst of this epidemic.

It is exclusively by *warm baths* that Hippocrates encountered the cholera-morbus. The warm bath, in the epidemic of India, has been a matter of great controversy; lauded by some, always at a high temperature, they have been proscribed by many others especially on account of the humidity and coldness which their use inevitably occasions, in spite of the greatest precautions.

*Rubefacients* of all kinds and in every degree have been employed, with the intent of recalling vitality to the circumference, of reanimating the circulation and exciting warmth in the cold surface of the skin; but generally *sinapisms* have been preferred.

The private correspondent of our very zealous colleague M. Reveillé-Parise, has informed him that at Batavia they have ascertained the dangers of every emission of blood in the epidemic cholera, and that they there administer with almost constant success, a mixture of two parts of *essence of mint* (spiritus menthæ) and one part of laudanum. In Russia as well as in India, we almost always find the essence of mint associated with opium.

In passing from Asia into Europe, the therapeutics of the epidemic cholera have not made any very important acquisitions; scarcely have the physicians of Russia added any thing to the treatment recapitulated of the physicians of India. All that we have seen in the Indian therapeutics is to be found in that of the Russians. Among the latter however calomel seems to have been a little less in vogue; its advantages have been less highly extolled, the insufficiency of it has been more candidly admitted, it has been given in smaller doses and with less persistency, and some physicians have even totally proscribed the use of it.

But now, bleeding especially at the beginning of the disease and sometimes also in its advanced stages; calomel almost always combined with opium; aromatics; diffusible stimulants, such as ether, volatile alkali, camphor, musk; vapour baths, sand baths, baths with a strong decoction of hay; sometimes purgatives, and especially torrified rhubarb for the purpose of overcoming the obstinate constipation which persists during the convalescence: such in short, has been the therapeutics of the Russian physicians against the epidemic cholera. Nitrous ether,* oxygenated muriatic acid diluted with water, have

* Alcool nitrique.

been equally tried with some appearance of success.

It has sometimes been observed that opium in large doses augmented the intensity of the contractions of the extremities; and it is in these cases that camphor, ether, and musk have been administered with advantage.

Riverius' draught has been constantly advised and prescribed in order to allay the vomiting; and we may observe that this symptom is most fatiguing and most obstinate in persons addicted to intoxication and gluttony.

Against the cramps of the inferior and superior extremities, in addition to the baths of which we have spoken, we also find indicated dry frictions, frictions with spirits of camphor, and aromatic cataplasms.

It is especially in powder and united with pulverised gum Arabic, that the Russians recommend the administration of calomel. On this subject, they call the attention very particularly to the astonishing capability of the patient to bear strong doses of this substance without its determining any of those bad consequences so frequently formidable in other cases of disease.

Injections with the decoction of bran or starch, to which laudanum was added, were administered for the diarrhœa, to which were also opposed ene-

mata consisting of decoctions of small bitter oranges, gum arabic and opium.

The private correspondents of the Academy have informed us that very skilful physicians had given the extracts of hyosciamus and cicuta with remarkable success. Dr. Haaz boasts particularly of the extract of nux vomica.

Doctor Foy proposes, as capable of modifying the nervous state in cholera, the distilled water of the cherry laurel and the distilled water of bitter almonds. It would be well however to mistrust the effects which these means may produce at that stage of the disease in which the oppression of the forces constitute the only symptom of it.

At Warsaw, Dr. Leo was convinced that the disease presented no inflammatory character. He consequently opposed, in a general manner, every idea of blood-letting. To him blood-letting most frequently seemed dangerous.

Calomel, according to him, vainly irritates the intestinal canal and also augments, with additional dangers, the alvine evacuations.

Opium given in small doses remains without effect; and if we increase the quantity of it, it diminishes, it is true, the vomiting and stools, but it kills, says Dr. Leo, by the narcotic excitations which it impresses upon the economy.

For these means Dr. Leo substitutes what he calls

"*his method*," of which the following is the substance. He administers every two or three hours three grains of the sub-nitrate of bismuth, in powder, combined with sugar. At the same time he gives an infusion of balm, and directs frictions with a heated mixture of compound alcoholic tincture of angelica and liquid ammonia to be applied to the superior and inferior extremities. At a later period he orders some doses of torrified rhubarb in powder; but he very particularly insists upon the bismuth in powder, and he affirms that he has not seen one of the numerous patients, who have been treated in this manner, perish: the cure has in general been accomplished at the end of five days. In the opinion of Dr. Leo, blood-letting was but rarely admissible, and only in young individuals of a robust constitution.

M. Brière de Boismont in one of his letters to our colleague Dr. Esquirol, confirms the advantages of this method in some cases. Every thing goes wrong in the midst of epidemic tumult: M. Brière de Boismont announces, in the same letter, that he has found considerable quantities of sublimate in the calomel administered at Warsaw.

If we have succeeded in rendering the general idea, which it is proper to form of the epidemic cholera, precise; if we have determined the true nature of it, and if the disease actually consists in a

diminution of the *innervation*, in a vicious direction of this innervation concentrated upon the internal organs, combined with a particular catarrhal affection of the gastro-intestinal mucous membranes, we will easily succeed in establishing the therapeutic methods best calculated to subdue this disease, and in comprehending the effects of those which have been advantageously employed.

One prominent fact strikes us, in deeply meditating upon the means by the aid of which they have combated the cholera in those parts of the East Indies, of Russia and Poland where it has been observed; it is the attempt which has been made both in Asia and Europe to discover an uniform, identical method of treatment, for all the individuals attacked with the disease, and hence the total inefficiency of the attempt. Thus we very evidently have seen that the means which have succeeded in some cases have been unsuccessful in others. Blood-letting which appeared beneficial in a great number of individuals, has been evidently injurious in many others. Calomel, which seemed to succeed so frequently in the Indies, has often failed at Moscow and at Warsaw. Opium, extolled beyond measure by the Indian practitioners, has produced, under the inspection of the Russian physicians, an augmentation of the spasmodic movements pertaining to the disease: whence it follows that there does not

exist, in the epidemic cholera, an uniform, constant treatment applicable to all cases.

This conclusion, which is also true with regard to all epidemics, we find explicitly admitted, and in a very positive manner, by Dr. James Boyle, who has for a long time studied the epidemic cholera in India. He says positively, page 13 of his Treatise, that we can adopt no uniform method of treatment for all the cholericks; that we must, on the contrary, vary the treatment according to each particular case. It is, he adds, in consequence of having indiscriminately put in practice, sometimes blood-letting, at other times calomel, here opium, there warm baths, that the physician has obtained so little success. Dr. Boyle relates a great number of examples of blood-letting practised unsuccessfully at the period when the blood still escaped freely from the vein. The patients have sunk.

According to the opinion of Dr. Christie, we must endeavour to appreciate the indications in this disease accurately: and in order to fulfil them we must employ different medicines according to circumstances: we cannot hope to find a specific applicable to all cases of cholera, no more than we can in a great number of other diseases. In this, as in many others, we must expect every thing from the tact and the judgment of the physician.

M. Meusnier, Doctor of the faculty at Paris, con-

sular agent of France at Tangaroc, in his letter to the Academy upon the epidemic cholera, thus expresses himself: " an absolute medicament cannot be pointed out, since blood-letting, drastics, acids, narcotics, the warm bath, and ice, have each in their turn had their successes and reverses. It is especially in the idiosyncracy that the general indications reside; it is thence we must derive the choice of the means which it is proper to employ."

In therapeutics, there is no rule of absolute perfection out of which every thing is wrong and only leads to error. Individualities, which vain efforts of abstraction have so often endeavoured to obliterate, are always there, with their peculiar constitutions and their special idiosyncracies, in order to change general predictions and command numerous exceptions. These individualities, which often modify in a special manner the morbid conditions, also demand a modification of the therapeutic agents. The great epidemic now under consideration, is a living proof of it. Without doubt it presents capital, general indications, and which may be synthetically expressed; but it also presents, in individual constitutions, in the variation of symptoms, and in the organic susceptibilities, other indications of vast importance.

To re-animate the general action of the innervation, and to render the distribution of the nervous

function more regular; to stimulate and warm the cold surfaces of the skin; to call life and motion from the centre to the circumference: such is the predominant capital indication in the epidemic Cholera.

To attack at the same time the catarrhal affection by the aid of means, the happy effects of which have been ascertained from experience, constitutes another analytic indication of nearly equal importance.

Finally, to combat the symptoms in proportion to their relative predominancy, is a secondary or symptomatic indication, which should not be neglected any more than the others.

With a view of fulfilling the indication relative to the innervation, diffusible stimulants and antispasmodics doubtless claim the first place. Thus the physicians of Orenburg have given, with success, a mixture of Hoffman's elixir* and essence of mint. This remedy had become so extensively popular, that every body took it by the title of preservative.

It is thus that Doctor Noel, when a considerable body of the French army, disembarked on the Coromandel coast, were attacked with Cholera, gave

* ℞. Peruvian bark, orange peel and sub-carbonate of potassa āā 2. Extracts of holy-thistle, of small centaury, and of myrrh āā 1; Madeira wine 48.—Tr.

divided doses of volatile alkali in sweetened infusion of balm with great success.

It was also with the same object that M. Deville prescribed, at Calcutta, strong doses of ether, from the very commencement of the disease.

It is, finally, in the same manner that are conceived and explained the advantages so frequently derived, at Batavia, from the mixture of two parts of the essence of mint and one part of laudanum, the use of which was persisted in until the cure was accomplished.

Blood-letting, in young, plethoric individuals, of a robust constitution, administered at the onset of the disease, immediately produces the restoration of the vital powers ; it revives the circulation at the circumference, and calls the blood and the heat to the pale and chilled surface of the body. It is then with this view, and, under the influence of these circumstances, that blood-letting has been advised and performed ; but in subjects of a feeble constitution, or accidentally debilitated, and at an advanced period of the disease, the abstraction of blood has been very often prejudicial.

In the series of remedies successfully administered against the catarrhal affection, calomel holds the first place, and is given in powder combined with gum arabic. Doctor Christie, in his interesting work on Cholera, has established that it is to this affection

especially that calomel is applicable. It is also against this state of the mucous membranes that Annesley prescribes calomel, in scruple doses, every three hours; often, he combines it with aloes, in order to obtain more promptly the evacuation of the creamy matter which fills the intestines. The bitter tincture, in the opinion of Annesley, brings about the same effect.

Here also internal stimulants are properly arranged, in the number of which M. Christie places the capsicum in particular; as also external stimmulants, giving preference to the stimulation produced by the application of vesicatories. Cataplasms containing a large quantity of mustard, applied early and retained constantly upon the whole extent of the spinal column, will be very efficacious in re-animating the innervation and in producing reaction to the circumference.

Doctor Poupireff has ascertained, in the government of Orenburg, the good effects of the serpentaria virginiana, when associated with cinchona, in reviving the nervous energy and restoring vitality to the circumference. Annesley also advises the bark, in powder, either by itself or combined with aromatics. But under circumstances, where it is so important to guard against the susceptibility of the stomach, how is it that the sulphate of quinine has not been thought of? combined with musk, with the

essence of mint, camphor, or ether, this would certainly be a powerful means of assistance. We have not observed that the sulphate of quinine has been placed among the number of remedies administered against Cholera.

With the title of diffusible, and for the purpose of producing re-action, Dr. Milwood has extolled James' powder; and it is with the same views that the Dover's powder has been given. Cupping would also possess numerous advantages in endeavouring to restore vitality to the periphery.

Most of the articles recommended, for the cure of this epidemic, both in India and in Russia, were manifestly intended to change the direction of the movements, and occasion re-action from the centre to the circumference: as, for instance, frictions, liniments of every kind, baths of warm sand or of roasted bran, vapour baths, ordinary baths at high temperature, &c.

In attacking then the two general causes of the disease by means applicable to the individualities, we will doubtless oppose the symptoms which are the consequence or the effect of them; but it is in the epidemic Cholera especially that we must pay attention to the various indications resulting from the different stages of the disease, and the symptoms which constitute them.

Thus opium, which acts as a powerful sedative, quiets the vomitings and arrests the diarrhœa; it

also diminishes the irritability of the system, and advantageously modifies the altered secretions of the intestinal mucous membrane.

The sub-nitrate of Bismuth seems to have all the advantages of opium, without possessing any of its inconveniences; however, notwithstanding the attempts of Doctors Odier and Marcet, the therapeutic value of this substance has not yet been definitively determined.

Frictions, to the superior and inferior extremities, with the oil of turpentine, cannot fail to be advantageous in contending with the cramps.

Against the constipation which supervenes during convalescence, rhubarb, magnesia and calomel have been given.

The applications of leeches, at the onset of the disease, cataplasms and sedative liniments, often successfully overcome the epigastric anxieties and pains: general bloodletting would be preferable for the removal of internal inflammation, in those cases in which either the symptoms or the consecutive occurrences denote its existence.

The vomiting is, without contradiction, the most obstinate and most distressing symptom of this disease. Riverius' draught arrests the vomitings, and opium might also be administered with some prospect of success. Injections, containing a pretty large quantity of laudanum, thrown into the rectum,

are efficacious in stopping the alvine evacuations.

It is especially towards the diminution of the evacuations that the symptomatic indications should tend. Nothing leads more rapidly to the destruction of the strength, nothing hastens more speedily the progress of the most formidable symptoms, than the frequency of the vomitings and stools. Not only does every medication, every reparation, then become impossible, but there also results a general exhaustion and absolute loss of every vital resistance, by the deperditions and lassitude which the incessantly returning calls for these continual dejections occasion.

Again let us repeat that in order to direct successfully the therapeutic of Cholera, we must not lose sight of the two constituent elements of this disease ; and especially is it necessary to apprehend clearly the indications which flow from them.

It is very essential to attack each of these elements in the order of their respective prodominance, that is, attend to the catarrhal indication when that is most prominent ; and to the nervous indications when they bear the sway.

We must not omit saying, that, in this dreadful combination of pathological disturbances, as in all complications of disease, it is often sufficient to attack successfully one of the agents, especially the

predominant agent, in order to insure the cure of the patient. The powers of the organism though apparently annihilated, and thus the most prominent feature in the disease, have shown themselves quite sufficient to work out the cure of the complaint thus simplified or reduced.

Unfortunately there are no cases on record, of cholera regularly observed when left to the action of the powers of nature alone, independently of every medical modification. Consequently we cannot compare this order of facts and their results with the results obtained by the combined assistance of nature and of art. It would especially be necessary to establish the comparison of these facts in the midst of analogous conditions, favourable or the reverse, that is to say, with equal chances of safety or destruction.

We might advance, however, in a general manner, that those unfortunates, who, impelled by fatalism, blinded by ignorance, or abandoned to the desolation of poverty, have not been assisted, have almost all died; but, independently of the vagueness of this assertion, we should not forget that, in these cases, the patients of this class were not in equal conditions with others; these, from the simple fact of their position, were placed in the midst of those conditions in which the epidemic proves most destructive, such as want, poverty, uncleanness, &c.

# PART SIXTH.

## GEOGRAPHICAL MARCH AND MODE OF EXTENSION OF THE DISEASE IN ASIA.

Having exposed the series of changes developed in individuals attacked with Cholera, we are now about to give a rapid sketch of the course of the disease through the different places which have been the theatre of it. In other terms, having recapitulated the pathological march of the disease, let us also endeavour to give a summary of its geographical route. We shall see whether, from these investigations, any new data will arise for the solution of the problems which have been proposed to us.

We have not forgotten to mention, and we have the design to prove that, at all times, in India, that is to say, since this country has been medically explored, the Cholera has been observed there in the sporadic state, in the endemic state, and in the catastatic state.

Observation rested at this point when, in 1817, the scourge under consideration broke out in the eastern regions of the Peninsula of India.

Let us mention here, however, that long previous to 1817, in the year 1783, we find two facts, at least, of this severe epidemic in India.

The first occurred in Hurdwar, where the Ganges takes its source. This country, regarded as sacred, is the rendezvous of a famous pilgrimage, which takes place there every year, and of an extensive pilgrimage, much more famous still, which is renewed every twelfth year only: 1783 was one of these twelfth years.

A fabulous number of pilgrims were there congregated together upon the borders of the river, where they passed the night, poorly nourished, badly clothed, in the midst of all the filth of poverty and excess of debauchery. This year the Cholera broke out at the commencement of the sacred ceremonies. In less than eight days, the disease counted twenty thousand victims; yet, nevertheless was so slightly propagated, that it did not reach even the village of Juwallapore situated seven miles distant. The epidemic ceased at the same time with the pilgrimage and the ceremonies which were connected with it.

Second fact. In the northern Circars, a very narrow tongue of land on the sea coast, encamped a division of a thousand artillerists, under the command of Colonel Pearce. In the spring of 1781, this detachment proceeded to rejoin the main body of

the army encamped upon the coast. The epidemic Cholera attacked this detachment. The disease was rapidly fatal; the catastrophe happened at the expiration of a few minutes, and in the midst of intolerable spasms. It was death, says Colonel Pearce, and not disease, that reigned in the camp. Out of one thousand soldiers about seven hundred died. The epidemic ceased at the end of six days in consequence of changing the station.

In this epidemic, says the historian, a frequent, but perhaps exaggerated, use was made of the antimoniated tartrate of potass.*

This, we may add, is one of the rare instances in which the emetic has been administered in Epidemic Cholera.

In the same country, in 1790, Colonel Cockerel, experienced similar misfortunes among the troops which he commanded in that station; but in a less violent degree.

However, it is at Jessore, a city situated thirty-three leagues north-east from Calcutta, in the Delta of the Ganges, that this scourge really manifested itself for the first time. In the afternoon of the 19th of August, 1817, Doctor Robert Tytler was called to see a Hindoo who, during the preceding night, had been attacked with evacuations both up-

* *Tartar Emetic.*

wards and downwards, accompanied with the most atrocious pains. The patient died the day following, without any person so much as dreaming of the Cholera-morbus. At a distance from the place some just suspicion was entertained of poisoning by the *datura stramonium*, inasmuch as the patient was to have appeared on the following day as witness in a criminal cause. But on the morning of the 20th of August, it was ascertained that ten other individuals, in the same corner of the bazaar, had died with almost the same symptoms, and that seven others had perished likewise; it was also known that the disease had invaded several divisions of the city. Doctor Tytler attributed the disease to the bad quality of the rice, which, we know, is the food of the Indians.

Nevertheless, the number of victims increased from day to day. Soon was it ascertained that the disease had already made its appearance, in the month of May, in some parts of Nuddeea, as well as in some other parts of the surrounding districts, and that it reigned in all the country comprised between Silpet and Monghir, even from the mouths of the Ganges to its junction with the Jumna.

Already at this epoch, one was struck with the singular mode of propagation of this disease. Often by its ravages, it described a complete circle around a place, without at first penetrating into it, and then

removed to a distance ; so that it might be considered free from danger, when suddenly it returned several weeks or even months afterwards. It has also been seen to ascend and descend, for a considerable distance, one of the banks of the Ganges, then stop suddenly, leap across the river, and recommence its ravages on the opposite bank.

Let us dwell for a moment, it is necessary we should, on this first appearance of the disease. The Cholera had reigned epidemically, during the first six months of 1817, in the country of Nuddeca and its environs: whilst the neighbouring, surrounding villages remained entirely unmolested, the city of Jessora and those of the districts round about were ravaged; a great number of districts remote from one another have been invaded simultaneously or at very short intervals, whilst others much nearer were respected. Here then the disease was not extended by any of the means of successive transmission, and it must be admitted, without a possibility of contradiction, that it was primitively established under the action of occult, general causes, that is to say, by the epidemial influence.

At Calcutta, the Cholera manifested itself for the first time early in the month of August, scarcely one month after its appearance at a distance of one hundred miles from that place : it seemed to gain ground

more and more: but it did not attain its acmé until the first days of the month of September. The number of victims was seldom less than two hundred a week, in a population of a million of inhabitants. The disease was much more destructive, when on the 7th, according to others, the 9th, of November, it attacked, in taking a direction from east to west, the army encamped on the right bank of the Betoah, and concentrated at Jubbelpore, Mendelloa and Sangor. The Cholera-morbus made such terrible ravages in this army, composed of ten thousand English and eighty thousand natives, that a multitude of domestics and other individuals in the train of the troops expired in a few minutes. Those who lived on vegetable substances were first taken off; women and children seemed to be spared: but, remarkable circumstance, so sudden as was the invasion of the disease, so prompt was its cessation. When the army had crossed the river Betoah, taking up its march along its eastern side, the Cholera was, as it were, cut off. The number of those who died and fled, during the six days in which this epidemic continued, is estimated at from twenty to twenty-five thousand: according to other data, however, the number of the dead could have been only three thousand.

In the same month, and in the same week, the disease reigned in the districts of Behar and Dacca, very remote from and entirely foreign to one another; it also existed in the cities of Patna and Dacca, which are several hundred miles asunder.

Irresistible in its march, the Cholera-morbus extended in a short time over the broadest part of the peninsula of India, ravaging successively the cities and neighbourhood of Nagpore, Aurengabad, Ahmednagour and Pounah, in the direction of which great military movements were then going on.

On the 11th of August 1820, the Cholera broke out at Bombay, and carried off, previous to the month of February following, eleven hundred and thirty three victims: again in the month of September 1821 it returned, accompanied with excessive heat, when it destroyed, from the 23d to the 28th of the month, two hundred and thirty-five persons.

Pursuing the course of the Nerbudda, in an eastern direction, the disease arrived at Haschungabad. Beyond the river, in the southern direction, it was observed in the city of Moltay, towards Nagpore. These two places, and a great number of intermediate villages, had much to suffer; the city of Moltay alone, though inconsiderable, lost five hundred inhabitants: but between Nagpore and Moltay, all the country, which embraces about seventy miles,

remained unmolested; and Baitool, a large city situated directly between the river and Moltay, was not attacked by it.

The auxiliary troops of Nagpore, commanded by Col. Adam, afforded the first striking example of a numerous body of men penetrating into the epidemial region, and suddenly falling from a state of perfect health into a desperate state of disease. On the first of June, the division quitted Nagpore, in order to return to the cantonments of Haschung-abad; the disease then gradually diminished, and on the 17th and 18th of the same month almost entirely disappeared.

Let us follow the epidemic towards the junction of the Ganges and Jumna at Allahabad, and in a great part of these provinces of the north. The Cholera was first established there in the spring of 1818; it was afterwards observed developing itself in several towns situated upon the Doag and the western bank of the Jumna. At the end of March it suddenly broke out in the city and district of Allahabad, and there reigned several months with great activity. The troops stationed in the forts and in the town were not attacked until the middle of June following, notwithstanding they had very free communication daily with the city.

In the month of March 1818, still pursuing the direction from east to west, it reached Allahabab, a city

situated at the confluence of the Jumna and Ganges, where it maintained itself until the month of August; from thence it gained Delhi, Jagpour and a camp composed of fifteen thousand natives and an European company of artillery. The disease bore hardest upon that class of poor who had not even rice to eat; however the Europeans, who were most spared by the Cholera-morbus, perished more from intermittent fevers, which reigned simultaneously. Animals even were under the influence of a morbific constitution; many camels and goats died from diarrhœa; and a great mortality was also observed among dogs and horned cattle. It was even supposed by the Hindoos that the roots of the bamboo rotted under foot and gave way, when Cholera appeared in their neighbourhood.

Whilst ascending the course of the rivers which empty into the Ganges, the disease also spread over the western coast of Coromandel, and notwithstanding these countries were but thinly inhabited, it marched, without stopping, from the north to the south. In the month of October 1817 it was already observed at Neblore; in January 1818, at Madras; at Pondicherry, Carnate and Bellary, in the month of June. It was not until January 1819 that the epidemic appeared at Freiwandroum and in the Isle of Manaar, notwithstanding it was discovered in the island of Ceylon so early as the year 1818. Its invasion was always sudden, the individuals attacked

dying, very frequently, in the space of two or three hours. In no place, says Schnurrer, could its appearance be referred to the direct communication of one individual with another. Sometimes it leaped over several points in the line of its route, in order to return and visit with the greater rigour those place which it had at first spared. Its propagation does not seem to have had the least relation with the variations of temperature.

At the commencement of the same year, (1819,) that the Choléra-morbus appeared in the island of Ceylon, it also manifested itself more towards the east, at Aracan, Malacca, Sinkapour and the island of Sinang: then in the isle of Java, where it reappeared in 1821, again producing much evil. In the latter island the disease evidently manifested its relation with volcanic eruptions; and, on the other hand, it has several times happened that the disease has been suddenly interrupted in its progress, in consequence of explosions of the same nature. At Manilla, the epidemic was developed three days after a dreadful hurricane, and must have destroyed an enormous number of victims.

But, the more we advance towards the east, the more uncertain are the data, on account of the few communications which we have had with this almost uncivilized country.

Having visited the Islands Ternate, Coelebes, and Banda, the scourge of Cholera, in 1823, fell heavily

upon the isle of Amboina. At Macassar, the disease seldom continued longer than three hours; there involving in its work of destruction apes, dogs, and horned cattle. Two years previously an earthquake had been felt in this island.

The data on the ravages produced by the disease, in its march from east to west, are a little more exact. In the month of February 1821, its effects were felt at Surat; then upon both banks of the Indus, and, at the same time, at Mascat, Moultra, Bender-Abbas, and Bassora. From thence, it ascended the Euphrates by Hellé, and towards the end of August, 1821, it invaded Bagdad, where it cut off 30,000 individuals. In this country the name of *haouwa* was given to it, which signifies tornado. The Persian army, cantoned between Bagdad and Kourdistan, lost more than 2,000 men; in consequence of which catastrophe the Persians were obliged to raise the siege of Ezzeroun, to conclude an armistice and make peace with the Ottomans.

It was in the month of June, 1822, that the first patients were observed in Mossoul, in August at Marden, in September at Diarbeckur, in October at Orta, and in November almost simultaneously at Bir, Aintab, and Aleppo: in all these places there had also been shocks of an earthquake, especially at Aleppo. On the 10th of June, 1822, the epidemic made its appearance in the vicinity of Laodicea, and

on the 20th at Antioch, which were to the disease the pillars of Hercules, in its southwestern direction. Often, in these countries, death took place within two hours after vomiting had commenced.

Towards the close of August, 1821, when the disease began to manifest itself at Bagdad, it was productive of great mortality at Schiraz, where a trembling of the earth had likewise been experienced. Departing from Schiraz, the Cholera-Morbus, pursuing its way towards the north, extended to Zergoun and Mayin, where it stopped for this year. Jesd, situated farther to the east, was invaded by the Cholera, first in the month of September of the same year, continued to prevail there throughout the month of October, ceased on the arrival of cold weather in November, and reappeared at the commencement of the following year, 1822. From thence the disease again took a northernly direction, spreading desolation throughout the cities of Nain, Kashan, Koom, Kozbroun, Sava, Dain, Killat, Nargan, &c. In summer it reached Tauris, without, at this time, penetrating into Tehèran.

Let us dwell for a moment on this fact. The disease reigned in the west, where it was propagated in various directions. The city of Tehèran remained entirely exempt from it. The Schah, from the advice of Dr. Martinengo, interdicted all communica-

tion between this city and the environs; he especially forbade the entrance of caravans into it. The Cholera had, however, mowed down one third of the population of Bassora and of Bagdad; but let us also add, in order that we may say the whole truth, that the Cholera made pretty extensive ravages at Tehèran in the year 1827.

The cold weather of the month of November soon put a stop to the march of the epidemic; but it reappeared the year after in the month of March, and pushed its way even to the frontiers of the Russian empire. In the month of May, it appeared in the province of Schirwan, but recently ceded to Russia. On the 17th of June it made its appearance at Lenkoran, on the borders of the Caspian Sea, in the isles situated at the mouth of Kour; it ascends this river, enters the vallies and gorges of the mountains, and arrives at Bakun, a city whose population comprizes 12,000 Persians and 800 Russians.

In the northern direction, the epidemic was traced no farther than Saharempore: the lofty chains of mountains, which in other places merely retarded the march of the Cholera, here seemed to intercept it completely, and thus preserved the inhabitants of the mountainous districts.

In September the Cholera reached Astrakan, then Krasnojar; it continued a month in the former city, and only fifteen days in the latter. From what

has occurred during the last three or four years in Persia and Asia-Minor, we know that, in the countries in which the epidemic appeared for the first time, its appearance usually occurred towards the end of summer, and then it was not very violent, but so soon as the winter had passed, its intensity increased. Now, as the Cholera did not reappear in the course of the year 1824, either in Syria or along the borders of the Caspian Sea, we had some foundation for believing that the disease attained its natural limits at Astrakan and Krasnojar. Unfortunately it was not so. Having, from 1824 to 1827, revisited a part of the places which it had ravaged the preceding years, such as Chakolly, Calcutta, the island of Java, &c., it reigned at Pekin during 1821, 1822, 1823, and in 1826, at Koussou-Chaton, a city situated at the distance of 100 werstes to the north of the great wall. At Chakolly a little before the invasion of the Cholera, a contagious disease prevailed among dogs, which destroyed 13–16ths of their number.

In the Phillippine Islands of the Indian Ocean the disease made its appearance, where it gave rise to some facts relative to its propagation, which deserve to be noted.

On the 20th September, 1829, the *Topaz*, an English frigate, sailed from Calcutta. Its equipage had communicated freely with the countries in

which the Cholera existed, and with their inhabitants. Many individuals were taken sick at the very commencement of the voyage. The frigate stopped at Manilla, and then sailed to Port-Louis in the Isle of France; the Cholera, which reigned on board rapidly extended to the population of Port-Louis, where in six weeks it destroyed six thousand men.

In connexion with this fact, it is essential to remark, that the disease broke out suddenly in different quarters of the town; that several negresses had gone on board the vessel on the very day of its arrival; that they continued to remain there as well as frequent it, and the encampment also where the equipage was established; yet notwithstanding none of them were attacked with the Cholera.

The disease did not appear more promptly nor more violently in the environs of the encampment than elsewhere, and the physicians have stated positively that it attacked a great number of individuals who had nothing in common with them but the air which they breathed.

Finally, the disease attacked almost exclusively those poor individuals, who were destitute of the common comforts and even necessaries of life, and especially those whom an extenuation of misery had reduced to an almost habitual state of disease.

On the 14th of August, 1817, the royal frigate *La Cybèle*, navigating the China Sea, put in at

Macao, where divers refreshments were purchased for the equipage. Again setting sail on the 18th, she continued her course up the strait, when on the fourth day from her departure, several marines experienced the symptoms, and there the disease ceased.

It was on the 22d January, 1822, says our colleague Keraudren, in his interesting work on the Cholera of India, that the royal frigate *La Cléopâtre* cast anchor in the Manilla road; on the 30th the Cholera first made its appearance, and on the following days the number of men attacked multiplied to such an extent, that on the 7th proximo M. le Chevalier Courson, of the Ville-Hélio, commander of the frigate, ordered the departure for Macao. The number of patients had rapidly increased to thirty-two, seven of whom died. Eight days after the departure, there were no more new cases.

In the frigates Cybele and Cleopatra, M. Keraudren justly observes, no circumstance was presented which permitted the supposition that the Cholera was contagious. It must not be forgotten, he adds, that the latter vessel, the Cleopatra, had not the disease on board when she cast anchor at Manilla, and that it ceased soon after her departure.

M. Levincent, in his inaugural dissertation, presented to the faculty of Paris in July, 1829, relates the following fact.

In 1826, the ship *Fils de France*, sailed for Nantz, having had no patient with Cholera on board whilst she laid at anchor in the Ganges. Ten days after, in consequence of undergoing repairs, she was obliged to enter one of the basins on the right bank, which it became necessary to empty in order to expose her keel. The fermentation occasioned by the sun, in the muddy bottom of the basin, gave rise to miasmata; and eighteen hours afterwards the Cholera indiscriminately seized the men, the most vigorous as well as the debilitated. No change however had taken place in the regimen of the equipage.

This fact is particularly important, in as much as it seems rigorously to indicate that the Cholera-morbus may be spontaneously developed, in a vessel, under the influence of the insalubrious conditions adapted to their origin.

At the beginning of July, 1829, the disease had penetrated into the Russian provinces of Shervan and Bakou, whence it spread, following the great line of communication by land, as far as Tiflis, and from the port of Bakou, by sea, to Astrakan.

In the spring of the year 1830, news was received that the Cholera-Morbus had re-appeared in Persia, in the province of Chorazan, from whence it passed to Tauris, the usual residence of Abbas Mirza, where it committed great ravages. A

member of the Russian Legation was numbered with the victims, and Prince Dolgorouki, the minister, after a very serious attack, escaped death but with difficulty.

Before proceeding further, let us point out in a summary manner, the principal conditions of the extension of the disease in India.

In many circumstances, the epidemic Cholera of India has seemed to follow pretty exactly the march of bodies of military troops; of this we find several instances mentioned in the documents published by the health officers of Calcutta, Madras, and Bombay.

This congregating of men, fatigues, privations, dangers, and the excesses inseparable from a military life, seem peculiary favourable for the extension of this scourge.

In 1821, as we have already seen, the Persian army, cantoned between Bagdad and Kourdistan, lost more than two thousand men by the Cholera. This fatal circumstance caused the raising of the siege of Erzeroum, brought about an armistice, and shortly after led to the declaration of peace between the Turks and Persians.

We almost always find in India that the Cholera is developed simultaneously in several points, and in places very remote from one another, leaving a great number of intermediate cantons

in a state of perfect salubrity. It is thus, for example, that the Cholera appeared simultaneously in the cities of Behar and Dacca, which are at a distance of one hundred and twenty leagues asunder. It is also thus that between Nagpore and Moltay, which the disease so cruelly afflicted, the whole of the intermediate country remained healthy and unmolested.

Even in the midst of a vast region, suffering under Cholera in all its malignancy, we find certain tracts, considerable spaces, where the disease has not penetrated, whilst the surrounding country is but a theatre of despair and destruction. The Hill-Forts, in Kandiest, says Annesley, remained exempt from the Cholera, whilst the disease inflicted the greatest ravages on all the surrounding places.

The individual invasion of this disease is so abrupt, or, in other terms, the space which intervenes between perfect health and the full manifestation of the Cholera is so brief, that it becomes impossible to trace the intermediate changes, such as commonly occur in diseases transmissible by absorption; and as the greater number of patients have been seized without having approached any individual labouring under Cholera, it would seem that the epidemic mode of accounting for its occurrence is the only admissible one, especially

when the logic of the facts does not admit of any other.

The sudden and simultaneous appearance of epidemic Cholera in entire districts and particular stations; the abrupt violence with which it manifests itself; the great number of individuals attacked at the same instant; the fierce and rapid march of the disease, and its prompt disappearance after great devastation: these are so many considerations which seem to exclude every way of transmission except the epidemial.

In almost every part of India, persons attending upon the sick have been seized by the epidemic in numbers proportionately less than other individuals: persons attacked with Cholera when placed in large, well-aired and very clean apartments, in the midst of patients labouring under different diseases, have not communicated the Cholera to their neighbours: when there was a Choleric person in a house or family, the other inhabitants of the house, or members of the family, were not more exposed to contract the disease than the rest of the population: almost always, when there were several patients with Cholera in the same house, they were attacked in such a mode of succession, in a manner so sudden and so independently of one another, that it was not possible to suppose that the disease had passed from

one to the other: finally, when several individuals have been successively attacked, it has almost always been evident that each of them had been exposed to the same productive causes of the disease, and that moreover they had been prepared to contract it by the action of well-determined pre-disposing causes.

Doctor James Jameson, recording secretary of the Medical Council of Calcutta, has recorded in his report the following fact.—Out of two hundred and fifty-three physicians who have attended to the disease throughout its whole course, three only were attacked by it, one of whom died. The latter case was at Barrachpour, a station but slightly visited by the complaint. The other two, in whom the disease was not very severe, reached the centre of the army at Nagpore. The medical authorities visited the hospitals both night and day, remaining there for a considerable time, yet none of its members were seized with Cholera.

Doctor Annesley, for five years physician to the Madras Medical Establishment, had under his care a continued succession of patients, the average number being from one hundred and seventy to two hundred per day. The hospital was kept in a state of perfect cleanliness and free ventilation. All the wards were open and communicated constantly with one another. A great num-

ber of individuals attacked with Cholera were brought to it daily, and, notwithstanding these persons were indiscriminately dispersed among the other patients in the hospital, Mr. Annesley has never seen more than from six to seven cases developed in the house, and that during a period of five years.

The disease generally attacks those who are debilitated by forced marches, and by excesses of every kind; poor, uncomfortably lodged, badly clothed, and improperly nourished individuals; in a word, all those who are suffering from the depressing effects of fear and sorrow, from exhaustion consequent upon bodily fatigue or dissipation, from filth and the privations of extreme poverty.

Instead of increasing daily and perpetuating itself at the expense of the additional aliment which it constantly finds in its way, the disease has invariably followed, in the places which it has passed through, a pretty regular course of invasion, increase, maturity, decline and extinction.

Annesley, in the epidemic which he has so well described, proves that, in the first period of Cholera, the disease is rapid and generally fatal; in the second, more protracted and more successfully treated; and at a still later period comparatively mild, of short duration and very rarely mortal.

In 1823, Mr. Dillon calculated, from very accurate tables, that, in the beginning of the disease, there were nine deaths out of twenty-four, and towards the decline of the epidemic, one out of fifteen: in the most favourable times of the intermediate periods, the proportion was one death out of seventeen cases.

From the official reports of the Presidency of Madras, in 1818, similar results have been obtained, and the same at Bombay and Gaougoug.

Considered in its general duration, the disease has always been circumscribed within certain limits; as for example, three weeks, one month, two months, and seldom more than three months; the latter period has been rare in India, and this duration has never been in a ratio with the extent of the population.

At Husseinbad, the disease declined in fifteen days. In Astia, it reigned from the 23d of April to the 16th of May. At Vizianagram, it became general in the beginning of July and declined in December. At Mazulipatam, it broke out on the 20th of July, was general during the month of August, declined in September, and ceased in October at the moment the rainy season commenced. The irruption of 1823, in Bombay and its environs, was of three months' duration.

But observations of this kind derived from masses of regular troops, are generally more complete and entitled to a much greater degree of confidence; for here the facts can be collected more easily, and may also be determined with greater accuracy.

In the central divisions of the English army, the Cholera appeared on the 7th of November: from the 16th to the 22d of this month, it was at its highest degree of intensity; towards its close, it diminished considerably, and about the 2d or 3d of December it had completely disappeared.

In the division of the left, the disease began on the 10th of April. It was in all its vigour towards the middle of the month. On the 21st, its intensity was diminished, and after the commencement of the month of May there was not a case to be seen.

With regard to the Nagpoor division of the army, which had fallen suddenly into a malignant jungle, (*foyer epidemique,*) it was different. Here the Cholera, without any perceptible distinction of its periods of invasion and increase, immediately attained its acmé. Thus the disease, which commenced on the 31st of May, had already diminished on the 5th of June, and, on the 18th, had almost totally disappeared.

Among the troops of Rajpoutana, the periods of the disease were still more rapid. The disease

appeared on the 14th of September; it raged with fury until the 20th, and then, rapidly diminishing, it ceased entirely by the 1st of Octoder.

In the division of Hansi, the Cholera began its course on the 6th of August; it increased in force during some days, and then, gradually declining, by the end of that month it was completely extinguished.

When more or less considerable military detachments encamp in the midst of these epidemic jungles, (*foyers*,) or even when they merely traverse them, the soldiers almost always contract the Cholera, and that in an intensity proportioned to the action of the general predisposing causes under the influence of which they are found placed: such are anterior fatigues, bivouacs, unwholesome food, humidity, soldier's excesses, &c.; but then the invasion of the disease is sudden, simultaneous, and general.

We read, however, of many instances in which bodies of soldiers, being assailed by the disease, have formed a junction with other troops, yet the latter remaining in health, notwithstanding such junction.

On the morning of the 11th of May, 1817, a detachment of the first battalion 26th regiment of native infantry, consisting of ninety men, came from a lower post to join the main body of the army

encamped at Sangar. During an ordinary march, the detachment in perfect health, halted half way, selecting as a place of shelter the borders of a lake, situated in the midst of an open plain, and about three miles in circuit, the environs interspersed with trees, and agreeably undulated. All these men continued well even at nightfall; then the Cholera burst forth. The first patient was seized at midnight: he died in half an hour; and before sunrise, twenty-four men out of the ninety were taken down with the disease. Although the camp of Sangar was only five or six miles distant, the men belonging to the detachment were too weak to advance without additional assistance. The patients were transported on carts and litters brought from Sangar: but before 11 o'clock in the morning, when, near the close of their journey, five were already dead, and all the others in a moribund state. The next morning a soldier of the same detachment was suddenly seized whilst brushing his clothes; he died in a few minutes. Several others fell sick on the three following days, and before the close of the week the whole of the detachment had entered the hospital. Notwithstanding these men were indiscriminately mixed with the troops of the camp of Sangar, not one individual among the latter was seized with the disease.

In a fort, separated from the city of Hutta merely by a spacious street, there were a number of Seapoys who remained in a state of perfect health, notwithstanding the violence of the Cholera caused a prompt evacuation of this city; yet the fort was small, its situation less salubrious than that of the city, and its communications with it unrestricted.

At Kotah, where several hundred persons died daily, the citadel, placed under the influence of similar conditions, was in like manner unmolested.

The islands at the mouth of the Ganges, which lie near the banks where the Cholera-Morbus reigned, were not invaded by it, notwithstanding their population is dense, and the communication with the country, ravaged by the disease, free and uninterrupted.

When the main body of an army is attacked with Cholera it will soon be released from it by separating and dividing into several detachments. This happy change will be still more likely to happen, if the main body removes to a better station.

From the 6th to the 8th of November, 1817, the disease, which had gradually approximated the encampment occupied by the central division on the banks of the Sind, penetrated into this portion of the army, then under the immediate command of the Governor-General Marquis of Hastings, formerly Lord Moira. It first attacked the Indians

employed in the suite of the troops, but soon burst forth every where, seizing Europeans as well as natives, and causing death in the space of a few hours. It became necessary to shift the encampment. The march was disastrous: eight thousand, or at least one tenth of the regular soldiers, perished in less than one month. On the 22d and 23d of November, soon after the station was changed, the disease became less generally prevalent. On the 8th of the following month, there was not a single case of Cholera in this division of the army.

Annesley cites many examples in which entire detachments, quitting a station where the disease reigned, lost in their route a certain number of sick: but, when once arrived at the new station they intended joining, having no longer any with the Cholera among them, neither giving rise to it in those with whom they became intermingled. Among other facts recorded in his work we find the following. The Cholera attacked the country troops stationed at Mallinghaum in Candeish; it reigned with violence over the soldiers posted on the left of the line. The seventeenth battallion of infantry, on the contrary, which occupied the right of this line, were entirely exempt from it, notwithstanding it maintained a constant and free communication with the same individuals. This seventeenth battallion, which preserved such a satisfactory state of health so long as it occupied this position, suffered much

in its turn from the Cholera, in its route from Mallinghaum to Ellichapour, where it was to rejoin the army under the command of Major-General Sir John Doveton.

The Physico-medical Society of Calcutta, in its interesting collection of memoirs, similar to that of our ancient Royal Society of Medicine, has published a considerable number of partial topographies of India. These topographies, detailed by physicians and surgeons of the English army, are recommended by the extent and variety of information which they convey, as well as by the accuracy of their clinical instruction. In these memoirs are exhibited numerous instances of local insalubrity, which it is difficult to avoid, pervading almost every part of India, and also the great extent to which bilious intermittent, and remittent fevers, cholics, dysenteries, &c., &., prevail in this country.

But on the other hand, we perceive, with satisfaction, that there are certain descriptions of privileged places where conditions most conducive to salubrity, public as well as private, abound: there they live in health; there convalescents may be securely sent; and never does Cholera occur in these situations. Such is the *plateau* of Neelgeries, which the estimable author of this topography calls the Montpelier of India; such also is Mount St. Thomas.

It seems certain that the winds neither hasten nor retard the march of Cholera. We have perceived the disease pass from Bengal into the Deccan, and forwards from Jaulna towards Punderpoor, against the southwest wind, which constantly blew at this time during several months in succession.

Neither do streams, rivers, lakes, nor arms of the sea, oppose the extension of the disease. It seems, on the contrary, that the freshness and humidity of the atmosphere, which reign upon their banks, favour the propagation of it. The Cholera does not absolutely depend, however, on the influence of humidity, on the vicinity of seas, lakes, rivers, and marshes, since places totally opposite have also been subject to it. It has ravaged countries situated, as Catamandou in the Nepaul, more than two hundred leagues from the shores of the ocean, countries which, like Persia and the Arabic Peninsula, have neither rivers, brooks, nor marshes.

The observations of the physicians of Orenburg and especially those of Doctor Lichtenstadt, prove that the epidemic was more violent and severe in close weather, on moist and warm or moist and cold days, than when the days were dry and warm; during dry and cold weather especially, few new cases supervened.

Certain pretty well attested facts seem to prove that the Cholera is scarcely ever established on

elevated plateaux or mountains. It has not been observed, says Schnurrer, at six thousand feet above the level of the sea. At Tauris, the inhabitants attacked by the disease, retire to the mountains, and thus escape its fury. Dr. Hasper, on the other hand, affirms that he has sometimes seen the Cholera in elevated countries, upon the mountains, at Nepaul for instance, which is more than four thousand feet higher than the ocean; at Jabolpour, on the southerly aspect of the mountains of Rewath; on the highest plateau of the Isle of France, upon the peaks of Tartary, in the midst of the sandy deserts of Arabia, and in the desert Diabekir.

In the month of June, 1818, the Cholera made its appearance upon the lofty mountains which separate Hindostan from Nepaul, and it was also observed in the valleys of Catamandou, Padthum, and Bhatyoun, the elevation of which is more than four thousand feet above the level of the sea; and it even appeared upon the high peaks of the neighbouring districts of Himmalah. Doctor Gowan, however, who described the latter irruption, in a memoir communicated to the Medical Society of Calcutta, is fully confident that the disease never appeared at a greater height than six thousand five hundred feet above the level of the ocean. Even until the present, at least, the mountains of Nilgherry, which limit Mysore in the centre of the Indian peninsula,

have been exempt from the Cholera which ravages at their foot the plain of Counbature. These mountains have an elevation of eight thousand seven hundred feet above the ocean, and the habitations extend to at least five thousand feet.

The Cholera has been observed in India at all seasons. During the winter of 1818, it reigned with violence at Bombay. There, however, it has been noted, that the disease usually becomes milder, or even ceases entirely, at the approach of the winter season, in order to re-appear in the following summer.

In India, the Cholera attacks men more frequently than women and children. Schnurrer positively asserts that women and children seem to be altogether exempt from it.

On several occasions, it has been observed that the epidemic ceases suddenly after the occurrence of violent storms accompanied with thunder. Doctor Christie noticed a striking example of the kind at Kulladzy, in 1824.

The invasion of the disease generally takes place during the night and towards morning.

The commencement of the disease has, in the opinion of almost all practitioners, its prodromes, symptoms characteristic of the period of imminence, which we have previously exhibited. Well, the more intense and extensive the epidemic, the sooner do

these premonitory symptoms diminish, become less evident, and disappear.

In several places, a little before or at the moment of invasion of the epidemic, it has been noticed that different animals, dogs especially, have been attacked by various, severe, and mortal diseases.

In India, cases of relapse have not been unfrequent: few observers are there who have not cited examples of it: Annesley, Jameson, Searle, and Christie, consider it a very common occurrence.

Long after the cure, says Dr. Jameson, the stomach and intestines remain in an almost hopeless state of debility, and the frequent appearance of dysentery, or an obstinate diarrhœa, attest the great ravages produced by the Cholera on the constitution: in these cases the greatest attention must be paid, for some time, in order to prevent a complete relapse.

One important fact, and which has been pretty generally observed, is the following:—Every person living within the sphere of the epidemic region, who escaped the Cholera, experienced nevertheless, though in different degrees, the disagreeable influence of the epidemic. This influence was betrayed, in the invaded populations, by great uneasiness, frequent vertigo, sinkings carried even to syncope, pains in the stomach, constipation, borborygmi, anorexiæ, loss of appetite, gentle diarrhœa; in short,

by an universal disturbance of the intestinal functions. It was also almost universally indicated by those spontaneous lassitudes, that exhaustion of the muscular powers, which so frequently denote the imminence of grave maladies, those especially which appertain to nervous fevers and typhoid diseases, rather than those of an inflammatory nature.

## PART SEVENTH.

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### GEOGRAPHICAL MARCH AND MODE OF THE EXTENSION OF THE DISEASE IN EUROPE.

Let us now follow the geographical march of the disease, at that so highly important epoch, when crossing the Ural mountains, which separate Asia from Europe, the Cholera, without, as it seems, abandoning Asia, penetrated into Europe, first attacking those governments in the empire of Russia embraced in the same latitudes, and afterwards advancing upon us in the two-fold direction from the east to the west, and from north to south.

Let us inquire whether, under the influence of these climates, in which the epidemic Cholera had been hitherto unknown, the disease has lost or gained any thing, and also endeavour to ascertain whether any additional information, relative to its propagation, has been given by those physicians who have studied the subject in these countries.

The first appearance of the disease was in the city of Orenburg, in the military hospital; at which place, about seven o'clock in the morning of the 26th of August, 1829, the first case of Chol-

era was signalized. This fact, surprising in its nature, has been as positively established as comports with the bounds of possibility.

In the first place, however, let us cursorily notice the principal data relative to the topography of the country.

The city of Orenburg, lying in the 51° of north latitude, and 72° of east longitude, is situated between the two chains of the Ural range, in a spacious, open valley, destitute of wood, and extending in a direction from north-east to south-west. The valley is watered by two rivers, one small, the Sakmare, and the other more considerable, the Ural. It is a little above the confluence of the two rivers, and on the right bank of the Ural that the city presents its picturesque appearance. The soil on which it stands is equally sandy and argillaceous, but habitually dry. The city, surrounded by walls and bastions, and having four large gates, is intersected by a sufficient number of streets of considerable width and running in a straight direction. The houses, for the most part of wood, are overlaid with stucco both within and without; the habitations of the poor, altogether of wood, are coated with clay.

The city has two suburbs, one on the north-east, called Cossack, the other on the south-west, named Slobodka. In these the houses are constructed of

a light, porous, moist wood, which is almost always in a half rotten condition. The entire population is about 11,000 inhabitants, of which number six thousand are soldiers.*

Provisions, consisting of bread, cheese, full-grown meats, mutton especially, of fish, vegetables, and fruits, are wholesome, abundant, easily obtained, and very cheap. Mutton, for instance, is there sold at 50 cops the poud,† that is to say, 90 cents for 40 pounds, or about two cents the pound of this country.

The inhabitants generally drink the waters of the Ural, which is clear and of good quality.

It should be mentioned, however, that epizooties, or epidemics among cattle, are annual in this country, by which a prodigious number of them are destroyed.

We may also state, both with regard to the physical and moral constitution, that the inhabitants generally have but few wants, and that asthenic diseases are very prevalent among them.

The peasants, for the most part, are principally dispersed in the steppes, where they are almost exclusively occupied in agriculture.

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* According to Malte-Brun, the number of houses is 2866, and the population 20,000.—Tr.

† The poud is equal to 40 pounds.—Tr.

Finally, notwithstanding the insalubrious construction of the houses in the suburbs, the city and its environs possess in sufficient degrees the known conditions of a great salubrity.

Behold then the Cholera primarily established in a city which scarcely presented any general cause of insalubrity. It is true, that the season, immediately preceding that in which the epidemic appeared, had been irregular, inconstant, and marked by great atmospheric vicissitudes; the humidity especially had been great and sudden, succeeding prolonged heats and extreme drought.

It is also true, that a considerable quantity of fruits of an indifferent or bad quality had been gathered in this year, and the inhabitants had freely eaten of unripe water melons and cucumbers.

It is also true that the *koumiss*, a species of drink made from fermented mare's milk, had failed, and still more the *knout*, an analogous but better drink made from the milk of the sheep and the cow.

But already, in antecedent years, had all these anti-hygienic conditions been frequently presented, in the same degree, and in similar combinations, yet without the least appearance of epidemic Cholera.

Let us further add with respect to fruits, that subsequently to their absolute interdiction, and notwithstanding the rigid measures adopted by

the public authorities to effect their total exclusion from the city, the disease increased with greater activity and counted a greater number of victims.

The Cholera having appeared then at Orenburg notwithstanding the salubrity of this city, it became necessary to seek elsewhere for its origin; the epidemic reason not being as yet presented to meditative minds, or rather this reason alone was not deemed satisfactory.

It is in this state of the question that the origin of the disease has been attributed to an importation imputed, by some, to the caravans arrived from Boukaria and Khiva, and by others, to the commercial relations established with the neighbouring hordes of Kirguis-Cossacks.

The Kirguis, a wandering and half-savage people, encamped in the immense *steppes*, beyond the Ural mountains, being in constant commercial intercourse with Turkestan, Boukaria, and Khiva, have long been in the habit of furnishing Orenburg with sheep, felt, camlets, &c. Now, when the Cholera appeared at Orenburg, we know that the epidemic was extending its ravages in Chorazan, in Asia and Persia.

Let us, however, examine both assertions, that is to say, the importation of the Cholera by caravans and by the Kirguis.

On the 26th of August, 1829, at nine in the morn-

ing, surgeon-major Smirnorff detected the Cholera-Morbus in André Yvanoff, a soldier of the 3d batallion of the line then in garrison at Orenburg, who was carried to the military hospital at Orenburg, where he died at about the expiration of twelve hours from the commencement of the disease.

From the 26th of August to the 9th of September, no other person in Orenburg was attacked with the Cholera.

On the 9th of September, at 11 o'clock in the night, another soldier, of the same batallion of the line, likewise attacked with this malady, was brought to the military hospital. He died towards five o'clock in the evening of the following day.

The day after, September 10th, two other patients were sent to the hospital, one of whom died, the other was cured. In both these cases the disease had progressed with less rapidity than in the two preceding.

On the 11th, a soldier of the same batallion was attacked and carried to the hospital; then on the 14th, a soldier of the batallion of invalids; again, on the 16th, two other soldiers of the same batallion, and, finally, on the 17th, two non-commissioned officers.

During the whole of this time, and until the 18th of September, only two individuals among the citi-

zens of Orenburg had been seized with the malady; both of whom died. One was an excise officer, the other a tradesman.

The commerce of Orenburg, a city altogether commercial, has for a long time been maintained in frequent, extensive, and important relations with Asia, India, and Persia: it is at least since 1813 that the city of Orenburg has been in the habit of admitting annually the caravans coming from Kiachta and Boukaria: now, the Cholera reigned epidemically in these countries during the month of August, 1817, and it was not until August, 1829, that it first made its appearance at Orenburg.

The caravans from Boukaria and Khiva arrived in July (the 20th at the latest) at Orenburg, were admitted into the Court for Strangers, after sanitary visits and inspection, but the Cholera was not manifested until the 26th of August.

Convoys making a part of these caravans, had entered about the same time into the fortresses of Orstia and Troitzka, yet the Cholera did not appear in these two fortresses.

The guards and camel-drivers, hired by these caravans in one place and in another throughout their route, have entirely escaped the disease.

It must also be noted that these Asiatic traders loaded and unloaded their camels during their journey; that whenever they arrived at an *aoula*

or encampment of Kirguis, they made numerous exchanges of merchandize for provisions of every sort, which consequently rendered it necessary to unpack the bales in which they were contained: yet, notwithstanding these different operations, there has not been a single instance in which Cholera was communicated.

From the 26th of August, the day in which the first patient, the soldier Yvanoff, was attacked by the disease, and who died with it on the same day, until the 9th of September, there was not a single individual seized with the Cholera at Orenburg.

The Cholera suddenly makes its appearance among the poorer class of people, in individuals worn down by hard labour and debilitated by extreme want. It was not first observed among custom-house officers, in continual communication with the suspected Kirguis and in constant contact with the suspected articles of merchandize. It has not attacked the merchants who purchased camlets, felts, and furs; it has respected easy or rich people who carried them. The traffic-market of Orenburg, situated at the distance of three *versts** from the city, on the right bank of the

* About two miles; a *verst* being nearly two thirds of an English mile.—Tr.

Ural, where, during the whole summer and one half of the autumn, the Russian and Asiatic merchants reside and exchange their merchandize with that of the Kirguis, it would seem ought to have been the first theatre on which the disease appeared; yet, notwithstanding, it was in a lesser proportion and at a later period that these quarters were attacked.

The Cholera had existed a long time in the city of Orenburg, when it broke out in the badly constructed fauxbourgs which constitute the boundaries of it.

Now it was not until the 28th of September that information was received of the first appearance of the Cholera in the environs of Orenburg; and, surprising circumstance! whilst the villages nearest to the city, having intimate relations and constant communication with it, were altogether exempt from the Cholera; whilst the fortresses adjacent to Orenburg and situated in the line of the two principal roads which terminate at this place, preserved their habitual salubrity,—during this time, the Cholera exhibited its accustomed ravages in villages at some distance from Orenburg, and also in a fortress situated at more than a hundred versts from this city, which had maintained but very little communication with it.

The villages lying east from Orenburg, between

the Ural mountains and the city, but beyond the latter, in the line of communication of Asia with Orenburg; these villages, Nieginka and Kaminoe for instance, although built along the upper Ural and having free intercourse every hour, as well as every day, with the city, have not been invaded by the malady.

In the military hospital of Orenburg, the Cholera began on the 26th of August, and did not cease its reign until the 20th of November; the number of persons attacked with the disease was two hundred and ninety-nine, of which number two hundred and twenty were cured and seventy-nine died: we have stated above that the garrison consisted of six thousand men.

In the city of Orenburg, the disease did not commence until the 15th of September; and on the 20th of November there was not, either in the city, or its suburbs, a single patient with the Cholera. Of the entire population of the city and its fauxbourgs, which is estimated at seven thousand, there were eight hundred and one patients, out of which number six hundred and eighty were cured and one hundred and one died.

Immediately after the city of Orenburg, the first two villages attacked by the epidemic were the burgh of Rassipnoe and the village of Bicoulovoy, placed at a great distance from one another, upon two

diverging routes, having intermediate to them a great number of other towns and villages which were not attacked at all or not until a later period, and also having much less communication with one another than each of them had with certain other places until then remaining unmolested by the disease.

The village of Bicoulovoy was attacked on the 28th of September; on the 25th of October it was exempt from the disease: there were in all sixty-one patients, of which number thirty-two recovered and twenty-nine died.

At Samarsky, the Cholera appeared on the 19th of October, and ceased on the 27th of November.

At Bardskoy-Stanitzka, it broke out on the 30th of September, and it was not until the 13th of November that no more new cases were observed.

The town of Rassipnoe experienced the first assaults of the Cholera on the 23d of September; the disease did not cease until the 24th of October. Out of a total number of 305 patients, they count nineteen deaths and two hundred and eighty-six cures.

But, let us extend the details of the invasion of the disease still farther. All accounts agree in imputing the developement of the disease to a wine-dealer who had gone on business to Orenburg, and

who, returning sick to the village, died of Cholera on the day following.

Now let us attend to the clear and exact account of this fact, as related by M. Schoumoff, chief physician to the brigade of Cossack horse-artillery stationed at Orenburg; let us transcribe the document.

1st. All those who were exposed to an immediate contact with the wine-dealer, during his illness and after his death, are entirely healthy, and not one, without exception, has been attacked with cholera.

2d. The wine-dealer fell sick on the 19th of September and died on the 20th; on the 20th and 22d there were no persons attacked by the disease. On the evening of the 23d there was but one individual, who had been suffering a long time from diarrhœa, and who, in addition, was intoxicated: he died in the space of twenty hours. On the 25th, in the afternoon, another individual was taken sick. On the 27th there were three new cases, and so on. I positively affirm that between the patients and those who had attended upon the wine-dealer, there had not been the least communication.

But for what reasons has M. Schoumoff been induced to emit this last, so positive, assertion; and how is it possible that he could prove it?

However, it is certain that the cholera, in a pret-

ty great number of cases, does not exclusively attack several individuals at once, as has been advanced by those physicians who have observed the disease in India. In Russia, it has frequently been noticed that individuals were seized successively, one after the other; and as to the secondary propagation of the disease by the air respired by the sick, certain facts, collected in Russia, prove that this mode of transmission has thus taken place under circumstances in which the patient inhabited a confined, ill-ventilated locality, or when the attendants, relatives and friends, pressed for too long a time, and in too great numbers, around the patient.

In every point of view, it is remarked that the disease has been less severe in villages than in the interior of hospitals. Does not this fact, which is generally admitted, seem to call for the measure, so propitious in other epidemics, of encamping and placing in barracks in appropriate locations those who are attacked with the cholera. It is especially in the epidemic, now under consideration, that this wise measure would be happily applicable.

Relatively to this mode of propagation, the air exhaled by patients, which seems to be established in Russia by a considerable number of facts, whilst in India there is not the least cause for presuming it, we will also say that, in these warm climates, they have no need of sealing up the cham-

bers of patients, who, on the other hand, find themselves as if naturally encamped or barricadoed in their own dwellings. Without taking into the account that, in these countries, the crowding together of patients and great accumulation of individuals, but rarely happens, because the population is not sufficiently dense to admit of it.

The district of Caen, from the first indications of the disease in the government of Orenburg, adopted the most particular and severe precautions against its propagation. Punishment of death was pronounced against every infraction of the sanatory laws; yet this district, notwithstanding, has been ravaged by the disease.

By the attention and vigilance of Boards of health measures of strict medical police have been taken since the first appearance of the cholera at Orenburg; these measures have been successively extended to the cities and surrounding villages, even to Moscow, without having the least effect in circumscribing the scourge. The disease burst out at Moscow in October 1830.

The disease, restricted at first to the interior of Russia and of Poland, proceeds onwards to the the coasts of the Baltic, and almost all the ports of this sea become infected by it. In Riga, on the 12th of June, there were two thousand five hundred and forty-one patients, of which number twelve

hundred and two perished. On the 26th of May the cholera was observed at Dantzig.

Towards the south, this dreadful scourge seems to have been equally progressive. Kioff, the Ukraine, Podolia, Volhinia, and Moldavia, in all these provinces the victims were numerous and in rapid succession, especially among the Jew population who were there plunged in the most profound ignorance, and consequently reduced to extreme poverty. At Brody, where out of thirty-five thousand inhabitants twenty-four thousand are Jews, there were, on the 9th of June, eight hundred deaths out of seventeen hundred patients. Gallacia and especially Limberg, Silesia, and particularly Olmutz, have not been spared.

Astrakan, a very commercial city, the population of which amounts to thirty thousand inhabitants, was visited by the Cholera in 1823. The disease reigned scarcely six weeks. The number of sick did not exceed two hundred and sixteen, yet the deaths were in the dreadful proportion of one in three. From this moment Russia adopted the most extensive and vigilant sanatory measures, in order to prevent the extension of the disease into the southern districts of the Russian Empire. Every body knows the result of these measures!

How great are the precautions which the public administration has taken at Moscow! Even when

the order was given by the Emperor for raising the cordon which surrounded the city, every possible means was used to hinder the disease from reappearing, and for preventing its importation into those places with which communication had been re-established. Houses suspected of infection continued to be sequestered; barriers of observation were maintained, and military cordons established, together with quarantines on the frontiers of the government of Moscow. As for the rest, it is well known.

Petersburgh, although eighty leagues distant from the nearest point where the disease had made its appearance, was also subjected to the most rigid preventive measures; a triple cordon guarded the communications; extraordinary hospitals were there established, and the government prescribed to the inhabitants the laying in of a year's provisions. Petersburgh has been twice visited by the epidemic.

And on the other hand, in Thorn, the Cholera has not been observed, or at least it did not appear in this place until a much later period: we know, however, that numerous boats coming from Warsaw, arrive daily at this large city. But we are now told that these same boats have conveyed the Cholera to Dantzick, situated at the mouth of the Vistula!

CONCLUSIONS RELATIVE TO THE MARCH AND EXTENSION OF THE DISEASE, BOTH IN ASIA AND IN EUROPE.

That the Cholera in India, Russia, and Poland, was primitively, generally, and essentially propagated by epidemic conveyance, is beyond the possibility of a doubt; the facts which prove it are both numerous and conclusive.

Under all circumstances, we have seen the communicative power of the Cholera exist in a constant relation, and in an exact proportion with the violence of the malady. When the epidemic was attended with most fatal consequences, its propagation was equally extensive. The power of propagation diminished, on the other hand, so soon as the epidemic lost its intensity.

In a great many places, the manifestation of the Cholera has been preceded by epizooties, more or less mortal, the ravages of which were exercised upon different species of animals.

At Moscow, a short time previous to the appearance of the disease, the atmosphere was obscured by enormous masses of green flies, the species of which was not determined. It seems that this phenomenon has repeatedly presented itself in Asia, under similar circumstances.

The disease has been attended with peculiar violence under determinate conditions of the organism. Individuals badly lodged, ill-fed, and ill-clothed; those who are physically or morally debilitated; those weakened by excesses, of whatever kind they may be; gluttons, drunkards, and gamesters; all persons suffering under the pernicious effects of uncleanness or the abandonment of poverty, were much more frequently and cruelly attacked with Cholera. In Poland, writes M. Brière de Boismont, the Jews are the first subjects of this malady.

In India in general, and at Dantzick, the disease attacks men in particular, and it is among them that it exercises its greatest ravages; at Casan and Moscow, women were more frequently numbered among the victims of Cholera. Every where, as has appeared hitherto, children are but rarely attacked: out of three hundred children employed at Casan, in a manufactory, wherein nineteen adult workmen perished, not a single child took the Cholera.

An elevated temperature was always inseparable from the existence and propagation of every species of contagion, and more especially of exotic contagions. The Cholera is developed, and has preserved the character of extension which is proper to it, at a temperature of thirty degrees above

zero, in India and especially Bengal, and at a temperature of thirty degrees below it, in Russia.*

Every where the general duration of the disease has been circumscribed by certain limits; we see it cease long before all the aliments of propagation which are placed within its reach have been exhausted.

The disease has not existed at all in several places immediately adjacent to those in which it reigned with fury, without the communications being suspended, and without greater preventive precautions being adopted here than there.

The disease has appeared simultaneously in places pretty remote from one another; and on the other hand, has not been at all manifest in some intermediate places. Again, these intermediate places have been invaded several weeks, months, or perhaps a year afterwards, without any appreciable cause or apparent reasons.

The epidemic Cholera began in Asia, in the year 1817. Holland and England, which keep up extensive and frequent commercial, political, and military relations with the East Indies, have not yet had the disease. It is only within a few months that these two powers have adopted preventive measures.

* According to Fahrenheit the range would be from 86° to 2°. —Tr.

In Europe, as well as in Asia, the cases of relapse have been so frequent, that it has become a common saying, that it is sufficient to have had the disease once in order to be more disposed to contract it anew, under the action of all the causes capable of giving rise to it.

The re-appearance of the disease in the cantons which it had deserted, after having there made more or less extensive ravages, is frequent, at least as much so as the examples of individual relapses.

On the 27th May, 1819, the population of Agra was re-visited by the Cholera, the effects of which it had experienced in the early part of July of the preceding year. The disease lasted eighteen days; and this second time it destroyed a much greater number of victims. Calcutta, Madras, Moscow, &c., have presented similar iterations.

Observations, in considerable number, attest that change of situation is both a very efficacious mode of escaping the disease when one has not yet been assailed by it, and a sure means of becoming cured of it when its attack has been realized.

It has been repeatedly noticed, that bodies of troops seized with Cholera, have been released from it so soon as they separated and divided into several detachments.

In the island of St. Maurice, where many of the

inhabitants were removed by this malady, twelve only of the Europeans perished, because the latter, placed in easy circumstances, immediately removed from the city.

At Calcutta, in 1826, the population experienced all the advantages of emigration, on the approach of the scourge the inhabitants quitted their dwellings, and they had no cause to regret the circumstance.

The invasion of the disease has generally taken place in the night and towards morning.

In India as in Russia, it has been remarked that persons who escaped the Cholera, though in the midst of the epidemic, experienced, nevertheless, the epidemic influence, which betrayed its presence to the invaded populace, by uneasiness, vertigo, syncope, anorexia, flatulency, constipation or diarrhœa.

That the disease, then, is capable of propagating and transmitting itself to a distance, is so evident a fact, that it is scarcely worth while exposing or mentioning it.

That, after the example of many other diseases, correctly appreciated in consequence of having been frequently observed, it is propagated by the epidemic method, that is to say, under the influence of occult, unnatural causes, and in a sphere of unbounded and immense activity, is also a fact

which no one denies, and which every one proclaims.

But with this mode of propagation is there not another connected; and do we not see the Cholera, in many circumstances and under certain conditions, introduced and established by the migration of individuals or the transportation of merchandize? In a word, can the disease accidentally extend in any other way than by epidemial influence? Such is the problem, reduced to its most simple form; and this the question which we now propose to discuss.

Unfortunately, it is in vain that we call upon facts and reasoning, experience and logic, for the solution of this problem. Reasoning and facts, logic and experience, reciprocally oppose, weaken, or destroy one another, and the mind free from every bias remains without the least conviction.

Here, gentlemen, let our attention be re-doubled.

Firstly. Districts, cities, and fortresses, have established rigorous sanatory measures, and the Cholera has not been manifested among them.

Facts of this nature, and they are not rare in the history of the epidemic under consideration, seem at first sight conclusively in favour of the non-epidemial transmission.

But to these facts, the opponents reply that places immediately adjoining those which were

attacked have escaped, notwithstanding every pre-cautionary measure had been omitted. Might it not equally be retorted, that the preserved countries which have adopted pre-cautionary measures, have not been attacked because such measures were had recourse to? The disease did not penetrate these places, because the epidemial region has not extended thus far.

Secondly. Countries, cities, and fortresses, have employed the most severe preventive measures; they have adopted them in season, and they have vigilantly insured their execution: yet, notwithstanding, they have been invaded by the epidemic. Cases of this kind are not rare; they have been observed at Orenburg, Astrakan, and Moscow, for example. These are proofs, it would seem, in favour of the exclusively epidemic propagation. But, the adversaries of this opinion say in their turn, that the sanatory measures, in these circumstances, were not rigorously enforced; and they always cite, in support, some cases of infraction; for, in the present state of civilization, and with the relations which exist between nations, cities, families, and individuals, how is it possible to hinder every communication?

Thirdly. Cities, fortresses, and bodies of troops, in the vicinity of the epidemic region, and having free communication with it, have not contracted

the disease. In Europe and in Asia, facts of this nature abound. Irresistible arguments, apparently, against the transmission by individuals or merchandize.

Not at all, reply the antagonists. If the disease has not been communicated in the midst of these circumstances, it is because the requisite general conditions, and the individual predispositions, necessary for its transmission, did not exist.

Fourthly. Entire cities, villages, fortresses, and bodies of troops, entered into communication with the epidemic region, have been infected and ravaged by the cholera: the disease then is transmitted by the communication of men and merchandize, say the one; by no means, the others affirm, the epidemic has been developed, in these last cases, in the same manner and by the same causes as in the preceding, that is to say, by the epidemial action.

Fifthly. Individuals place themselves in free and entire communication with patients labouring under Cholera: if they contract the disease, some assert that it is by the effect of communication; others affirm, that it is by the epidemial action: if they do not contract it, it is, according to the saying of certain persons, because the disease is not transmissible in this way; and, in the opinion of some others, that it is solely owing to the want, at this

moment, of the requisite pre-dispositions for contracting it, in these individuals.

How then can we escape from this labyrinth? Let us relate facts.

A member of a family, or one of the members of a house, being attacked, the disease somctimes declares itself simultaneously, at other times successively, in several individuals who are found in direct relation with the one first seized.

Among domestics in houses, and servants in hospitals, the proportion attacked has sometimes exceeded the proportion of persons seized with Cholera among the inhabitants in general. At Moscow, for example, if the proportion, for the population of the city, was three in a hundred, it was from thirty to forty per cent. among the attendants employed in hospitals. In India, on the contrary, Annesley has observed, that the servants of hospitals and of patients in general, were not more frequently seized than other individuals.

Surgeon Major Smirnoff has seen officers, ensigns and subalterns rendering assistance at the hospital during the prevalence of the Cholera. The city also furnished the hospital with many students and a great number of nurses, at this period, yet none of these individuals contracted the disease.

In many countries and in several instances, individuals either designedly or ignorantly, have slept

in the beds just quitted by patients who were cured of or had died with Cholera; they have clothed themselves in their shirts and other garments; have inhaled the breath of patients even in a moribund state; have touched and agitated the matters rendered by vomiting and by stool; have passed the night with the sick, and in the same bed; physicians have been inoculated with their blood, have injected it into their veins, have rubbed their skin with the matter of perspiration and the substances ejected, yet have escaped the Cholera. These observations, these diverse experiments, have been often repeated during the epidemics in Asia and Europe. It is however just to remark, that the resolution, sang-froid and courage which generally led to these experiments, must also have been serviceable in preventing the invasion of the disease.

In all the places where I have been, says Doctor Boschinski, who besides is a professed contagionist, I have noticed that from the very commencement, the Cholera attacked simultaneously a great number of individuals who had not previously any communication with the sick; persons recently arrived at places where the disease reigned, were especially attacked before they could have had the least communication with those afflicted with the malady.

Several individuals who have been subjected to quarantine during the full time, have nevertheless

fallen sick immediately after, and without being notoriously exposed.

On the other hand, some facts pretty accurately observed in Russia, and especially by the physicians of the government of Orenburg, tend to prove that, under certain determinate circumstances, the exhaled vapours alone of the circumscribed atmosphere of the sick may give rise to the transmission of the Cholera.

We have before noticed the fact relating to the city of Teheran; wherein this city was preserved from the Cholera in consequence of the precautions adopted by the Persian emperor, by the advice of the Italian physician Martinengo.

In Persia, the gates of Ispahan were closed against a caravan which appeared to be infected. This caravan was obliged to pass through Jesda. Shortly afterwards, the Cholera destroyed seven thousand persons in this place, and Ispahan escaped the scourge.

According to the report of Doctor Onoufrieff, the Cholera manifested itself among the Tartars of the village of Kamale, in the district of Bougdourousslausk, on the 10th of December. The first victim was an inhabitant of this village who had just arrived from Firis-Ousman, where the disease reigned. Next some of his relatives died, and then

many of the inhabitants. The population of the village is one hundred and seventeen. From the 10th of December to the 17th there were twenty-eight patients; one only of which was cured, twelve are dead, and thirteen still remained sick on the 17th of December. Another village inhabited by Russians, forty *sagènes** from the latter, having been informed of the appearance of the Cholera among the Tartars, surrounded the infected village with a sanatory cordon and broke off all communication with the inhabitants: it was preserved from the disease.

Our honorable associate Doctor Keraudren, in his interesting treatise on the Cholera, relates the following fact.

In 1822, the approach of the Cholera determined M. De Lesseps the French Consul at Aleppo, to take refuge with all those who wished to accompany him, in a garden at some distance from the city. His asylum was enclosed with walls, and surrounded by a wide fosse; having two gates, one for coming in and the other for going out. So long as the scourge lasted, he admitted nothing from the exterior without subjecting it to the precautions observed in Lazarettos. In this colony of at least

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* 280 English feet: a sagene being equal to 7 English feet. —Tr.

two hundred persons, and composed not only of Franks more or less acclimated, but also of several natives, there was not one sick person, whilst in the city four thousand persons were destroyed by the Cholera in the course of eighteen days.

One consideration, much more powerful still, in the epidemic Cholera of Asia and Europe, seems to give the greatest weight to the opinion of the transmission of Cholera: it is the immense extent of country it has passed through, in every direction of the horizon, under diverse latitudes, during opposite seasons, and in different climates. When we see a disease successively invade so long a series of regions, pursuing the course of the communications which the inhabitants have established with one another, the routes which have been traced for their mutual intercourse, are we not compelled to consider it as being propagated by individuals or merchandise, by the aid of persons or of things?

Medical annals, however, are not deficient in examples of diseases having thus successively reigned over a great extent of country, the introduction of which could not be attributed to any property individually transmissible.

The malady called *trousse-galant*,* which succes-

* A species of Ileus: also, the vulgar name of Cholera-Morbus. —Tr.

sively pervaded entire Europe in 1600, which should not be confounded with the Cholera-Morbus, mentioned by Zacutus Lusitanus, and described by him under the name of colic, having previously described the Cholera a few pages in advance—this colic, Zacutus himself attributes to an occult cause, a pestilential change in the atmosphere.

Let us also cite the epidemic catarrhal fever of 1731. It first appeared in Connecticut: on the following day it attacked the inhabitants of Massachusetts; two days afterwards, one half of the garrison of Annapolis Royal was seized with it; and two or three days later still, the disease extended over the whole of Newfoundland. Towards the middle of November it extended into Saxony and Russia; then making, as it were, a retrogade march, it passed into Holland, from thence into Scotland, and afterwards to London; after which, reaching the extremities of the territory of Great Britain, it penetrated even into Ireland. In Paris, it was observed towards the end of January; in the month of March it reigned at Naples, and in all the southern parts of Italy.

In order that we may approach nearer our own epoch, let us cite the epidemic which we have recently witnessed, the disease of the hands and feet, called "*acrodynia.*"

The disease, developed at first in Paris, has been successfully carried to Coulommiers, Méaux, Frère-Champenoise, and Montmirail. At the hamlet Bordes, it caused the destruction of one fourth of its inhabitants.

Persons who took up their habitation in those places where many individuals affected with the disease were congregated, soon contracted the disease; and if they quitted these places, they were almost as soon relieved from the complaint. At the barrack of Oursine, at that of Courtille, raw soldiers had scarcely arrived before they were attacked by the disease: in the environs of Ferté-Gaucher and Coulommiers, it was the same; indeed, it was merely sufficient for a labourer to commence working on an infected farm, in order to contract the epidemic.

Who is there would pretend to affirm that this disease was contagious, which besides, resembled no other, which was entirely new to us, and to which, until then, nothing analagous could be found in the annals of the science?

Now by the side of these well-established facts, of these assertions which no one can contradict, let us place what was written (November 1825) at the distance of 1500 leagues from us, and nearly at the same epoch, by Dr. Grierson, attached to the division of the English army at Arracan, and recorded

in the Memoirs of the Medical Society of Calcutta. There exists, says he, a disease which, I think, is peculiar to the natives of India. This disease, having no nosological title, I will designate it by this expression, "*burning heat of the feet*:" it is by this name that the natives themselves call it. There is often presented, conjointly with the malady, fever and intestinal pains; frequently also is the disease unconnected with any constitutional or organic affection.

It is met with in various degrees of severity; from a painful sensation of heat, dartings in the feet, even to a burning and insupportable pain which destroys sleep and appetite, and at length preys on the constitution. A similar pain is sometimes experienced in the hands at the same time. The pain of the feet, when augmented to a very great degree, sometimes mounts along the tibia as high as the knees. There is neither inflammation, tension, discolouration, nor any other notable change in the skin.

The disease is particularly common among those classes who are exposed to great bodily fatigue. Sometimes the skin is tumid and moist to a certain extent; sometimes vesicles, filled with a yellow serosity, are observable, and the nails also occasionally assume a yellowish tint.

Several physicians have observed the disease under the same form. All have vainly endeavoured

to discover a method of treatment which would prove uniformly successful: the disease has constantly been obstinate, rebellious, and tedious. It is not very unusual to see it terminate by death. (1.)

Without pretending to resolve the question, but merely with the hope of elucidating it, let us push our analogical comparisons still further.

Astronomical annals contain the history of a considerable number of diverse meteors which, after the manner of the epidemics we have just treated of, have traversed very extensive regions, the uniform action of which has been successively experienced in different countries, within more or less extensive limits, leaving certain cantons here and there unmolested, whilst others have been more or less severely visited by them.

Our very honorable colleague, M. Tessier, has, in a report, read before the Academy of Sciences in the year 1790, given some very singular details of a hail storm which took place on Sunday, 13th of July, 1788.

Six hundred and fifty square leagues were ravaged by this storm; its direction was from south-west to north-east; it passed from the south-western

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(1.) Extract from the Memoirs of the Physico-Medical Society of Calcutta, Vol. II.

extremity of France even to the north-eastern extremity of Finland; then traversed Zealand, Holland, and extended even beyond the Texel.

The appearance of the storm, as observed in France, was that of five distinct zones, of which two, encased in the others, were bands of hail. From Touraine even as far as Austrian Flanders and Brabant, that is to say in a medium space of a hundred leagues, the two bands of hail were always separated, although by unequal spaces, the narrowest being three leagues, and the broadest seven leagues and a half. The three bands of rain were much more extensive and irregular.

On either side of the limits assigned to the continuous bands, the storm had several interruptions; and at the points where the bands were continuous the borders were not so strictly confined as to prevent extensive and serious discharges. It descended upon six pretty extensive cantons of the electorates of Laon and Guise, whilst all the surrounding country was passed over uninjured.

The storm traversed deep vallies, lofty eminences, extensive forests, and broad rivers, especially the Loire and the Seine. It discharged hail in countries in which it had scarcely ever fallen before.

The meteor swept along at the rate of sixteen and a half leagues an hour. The total duration of

the storm was only from seven to eight minutes upon each point which it traversed.

The trees of the forest and those of large size were in general more extensively injured than slender trees and young coppices.

Certain parishes were almost entirely exempt from its destructive effects, whilst others in their immediate vicinity were completely laid waste.

In the year 1783, a thick mist was seen to arise, which, similar to the storm we have just described, successively spread itself over a great extent of country, over France, Holland, and England; traversing these places irregularly, and also leaving equally irregular and direful traces of its passage.

But again, these analogies of epidemic diseases, disseminated to a distance, independently of every transmission communicated from man to man, or from merchandise to individuals, and of which we could multiply numerous examples; the resemblance which, in their mode of extension, they bear to meteors, which travel from one place to another, attacking by preference certain localities, are not, we are well aware, adequate to the complete solution of the question under consideration, but they may hereafter lead to it.

These analogies, these resemblances enlarge the field of observation; they recall the attention to other series of events; and the understanding, ha-

bituated to consider the phenomenon under points of view less circumscribed, may, at some future day, derive from this consideration more satisfactory solutions.

In the meantime, let us say something of the prophylactic means which the Cholera demands under the present state of our knowledge.

## PART EIGHTH.

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### PROPHYLAXIS.—SANATORY MEASURES

In consequence of the immense improvement in social relations, during the last forty years, as well as from the effect of the advancement of the natural and medical sciences, hygiene, both public and private, has made so much progress in France, that we cannot resist this opportunity of announcing our expectations of being preserved from the epidemic invasion of cholera, or at least of seeing its cruel devastations diminished and extinguished at our doors. Look at what happened with regard to typhus in the years 1814 and 1815. In consequence of the two-fold invasion, of painful memory, the latter malady had made extensive ravages in Germany and our Rhenish provinces: it reached even Paris, where, both in the city and hospitals we had cases of typhus developed, in consequence of the numerous bodies of troops by which we were invaded. The disease, however, could not obtain firm-footing in the midst of the dense population of this capital, being opposed by the daily increasing comforts of civilization, the amelioration in the con-

dition of individuals, the advancement in knowledge, and the progress of hygieine.

In order that, with regard to cholera, we may arrive at similar and even more happy results, we will notice two kinds of prophylactic measures—those which relate to individuals or society, and those which are derived from private or public hygieine.

The disease commences, as we have seen, with derangements of the functions of the cutaneous tissues, of which the mucous membranes are only a kind of continuation or dependency. It is established upon the concentration of the vital forces at the interior, and upon the general effects of a very peculiar catarrhal affection: Hence, to maintain the normal state of the perspiration, to avoid the causes which tend to produce a catarrhal condition of the gastro-intestinal mucous surfaces, to prevent the perversion of the nervous function and its consequences, these are, summarily, the measures which experience has taught to be salutary as it regards the private hygieine.

It is necessary, in the first place, that the mind should be kept in a calm and sober state, free from every species of anxiety and distress. Regular habits, temperance and agreeable society are also conducive to the bodily welfare. Ambition, sorrow, fear, moral agitations, and in general the violent passions, of whatsoever nature they may be, thrown

into irregular and unrestained action, become so many certain causes of the disease.

It is requisite also, that the air should be pure, exempt from every species of vitiation resulting even accidentally, from numerous assemblages of men or animals; for it is especially in the midst of a dense and excessively crowded population that the cholera arises and is propagated.

Humidity, in whatever form, manner or combination it may present itself, must be carefully avoided. Cold and moisture, heat and moisture, have almost an equal power in producing the cholera. Care should be taken to keep in a dry, elevated situation, under a salubrious exposition, at a distance from evaporations arising from considerable collections of water, especially of stagnant water. The interior of habitations should be exempt from humidity, protected from unwholesome exhalations, spacious, properly aired, easy of ventilation, in a state of cleanliness, and at all times kept free from every encumbrance of men and animals of whatsoever species they may be.

It is under circumstances similar to those we are now considering, that the ordinary regimen of hospitals is found insufficient or even misunderstood. It would be well to have the power of encamping patients or of locating them by themselves in barracks eligibly situated. Particular houses should

also be set apart for the reception of convalescents, in order that they may be removed from the sick as soon as possible, since experience teaches us that relapses very readily and frequently occur, under the influence of conditions susceptible of giving rise to the cholera.

The clothes must be kept particularly dry and clean; they should always be sufficient without ever being slight; rather warm than otherwise, but especially in relation with the real state of the atmosphere, still more so with the season. Experience has shewn the advantage of flannel girdles worn next the skin.

Among the number of hygieinic measures which may serve to prevent the invasion of the Cholera, let us mention dry frictions, spirituous aromatic frictions, the common warm bath, compound, cold, or sea-water baths, according to circumstances: the bathing especially, which is now extensively used by all classes of people, must have an admirable tendency to preserve us from the attacks and progress of Cholera. We cannot be too cautious, however, in guarding against the humidity which is apt to follow the use of the bath when taken without proper precaution.

Constant caution, with regard to aliment, is a matter of the highest importance. It is almost always after deviations in regimen and excesses at

table, that the disease supervenes; and it is especially necessary that attention should be paid both to the quantity and quality of food taken as nourishment.

The aliments most appropriate are those which maintain an even balance between decided debility and redundant health; and those drawn from the animal should predominate over those of the vegetable kingdom. But let us dispense with these fastidious details of substances adapted to every condition exacted by the prophylaxis of Cholera; we would much rather state what ought to be avoided than what should be selected. Full-grown, smoked, salted, and fat meats, farinaceous or mucilaginous vegetables, milk, in great abundance, and watery fruits, have generally been prejudicial.

Drinks, of a bad or even indifferent quality, should be placed first in the list of causes which predispose to the Cholera. All liquids which readily undergo the process of fermentation, and which are so common and numerous in the north; all drinks prepared in Asia with mare's milk and fermented rye; brandy and strong cordials, the abuse of which is much more prevalent in those countries in which the vine is not cultivated, are so many drinks which predispose to the invasion of the Cholera. Nations, to whom nature has given, with the vine, water of a good quality, to whom she has specially imparted the gift of making

only a moderate use of these articles are much more highly favoured than they are aware of.

The hygieinic rules, quite the reverse of the therapeutic, are nearly the same for every individual. The slight modifications which the hygieine of certain persons demand, will be easily determined by the individuals themselves, from the knowledge which each has of his temperament, tolerances, and repugnancies.

Under the title of dis-infecting agents, camphor, vinegar, Guytonian fumigations, lime-water, the chlorides, &c. have been frequently resorted to. Experience will develope the efficacy of these agents.

It is to public hygieine that appertain the cleanliness and salubrity of cities, towns and villages; the direction, draining, and purification of marshes, ponds, and margins of rivers; the inspection of every sort of provisions; the amelioration of the indigent classes, whose subsistence should be liberally provided; the dispensation of that assistance which these classes require; the impartingof advice and consolation of which they stand in need; the lodging of troops in barracks and encampments; the movements of armies; the organization of provisory hospitals and retreats for convalescents, in case of need; the physical and moral regimen of prisons, and the arrangement of work-shops and manufac-

tories. In concert with physicians, as well as with wealthy and enlightened citizens, the public authorities, guided moreover by the rules of private hygieine which we have just laid down, will, at all times possess the prudence and foresight to anticipate every need and supply every deficiency. In fine, public hygieine is merely private hygieine on a larger scale,—hygieine, extended from individuals to assemblages, and from domestic necessities to the exigencies of society at large.

The administrative authorities should be particularly vigilant in seeing that the sick are visited and assisted speedily. M. Brière de Boismont, in one of his letters from Warsaw to M. Esquirol, has clearly pointed out the necessity of this vigilance.

But to the public hygieine also appertain those sanatory measures which may be demanded by the disease and authorised by our laws. On this point the academy is officially invested this day with a duty of the highest importance; it must pronounce upon the fitness of these measures.

We have already said, we have already shewn, that some facts noted, in Europe especially, and of which we have also perceived the indices in Asia, seem to prove that, under certain circumstances, individuals who have lived in the very hot-bed of the epidemic, or have merely traversed it, may carry the disease with them to the places whither they

are going, though these travellers themselves remain exempt from the Cholera.

Analagous facts induce the suspicion that individuals attacked with the disease, have been able, under certain circumstances, to transmit it to the inhabitants of the country into which they have been transported, or even to the persons by whom they are surrounded.

Lastly, other facts, and they are not few, tend to imply that the disease is propagated from one place to another by the numerous routes of communication. Let us state here, however, with a view to the interest of commercial relations, that we have not seen any positive fact mentioned from any source, which decidedly proves that the Cholera is communicated by the transportation of merchandize; individuals and their acquaintances alone seem to have given cause, in some instances, for accusation or suspicion.

Notwithstanding the facts of this order are, in our opinion, uncertain, imperfect, and vague, and may all be conceived and explained solely by the laws which govern epidemics; yet will it suffice us, so far as the science and our own conviction are concerned, to have emitted this opinion: and having before our eyes what has already been consummated in France, on this subject; guided by the example of neighbouring nations, all of whom have

adopted precautionary measures, and shuddering at the dangers to which humanity might be exposed, the committee do not hesitate to recommend unanimously, the sanatory measures authorised by the law of the 3d of March, 1822, or the ordonnance of the 7th of August, of the same year.

The Academy cannot terminate this part of its report without specifying to the government the difference which exists between sanatory regulations as applied to inland cities, towns, and villages, and the sanatory regulations in use in maritime towns.

In sea-ports, every thing that concerns sanatory police goes on smoothly, regularly, and even innocently; but is it the same as regards other places? The quarantines and military cordons stationed around a city in which a disease reputed transmissible, prevails, in addition to the demoralization which is the deplorable consequence of them, have also the fatal effect of repelling, of concentrating populations upon themselves, of augmenting the want of succour of every kind, of adding to the terror and tumult which there already reign, and thereby excessively promoting the increase of the evil: these are so many serious inconveniences which it would be advisable to avoid.

Finally, the Academy has only been enabled to work from documents, the accuracy of which it cannot guarantee, and from which it has often desired more copious details and deeper investigation. Placed at a distance from the theatre of facts, it has accumulated, assimilated, compared, analysed, and scrutinized them, and the conclusions which naturally proceed from them, are those which we now present to the government and the public.

# GENERAL SUMMARY

AND

# CONCLUSIONS.

After laborious research, a prolonged examination of documents intricately connected, after deep investigation of authors who have described the Cholera in the different countries in which it has appeared, and a methodical and critical analysis of the numerous facts collected on this subject, the Academy, happy in responding both to the solicitudes of the public and the confidence of the Government, hastens the publication of the result of its deliberations.

The Cholera-morbus is a disease which has been known and studied in every age and nation, and has been a matter of controversy in every school.

Our classics have successively described it—in the form of a sporadic disease, in which it has at all periods presented itself isolately, attacking only one or at least attaining but to few individuals at the same time ;

In the catastatic or milder epidemic form, in which several individuals are attacked at the same time, under the influence of a distinct and protracted medical constitution;

In the form of an endemic, in which the disease is produced by the influence of particular localities in warm climates; as has been observed in the East, in Hindostan, in Italy, &c.;

In the form of a symptomatic affection, of an accumulated series of symptoms intimately connected with diverse acute diseases, such as high grades of bilious, typhoid and yellow fevers, intermittent, remittent, pernicious, &c.

Under these different states and circumstances, the Cholera has never shewn itself transmissible. Never has it extended beyond the causes which excited it; never has it overleaped the boundaries in the sphere of which it was developed. Whence this rigorous conclusion, that the Cholera is not primitively, naturally and essentially transmissible.

Except in intensity, gravity, rapidity, and danger, the epidemic Cholera differs but little from the ordinary Cholera, with which we have been so long acquainted.

Hence, the epidemic Cholera of India is, as to its symptoms, the Cholera of the ancients. The numerous descriptions which we possess of it, com-

pared with that handed down by Aræteus, sufficiently attest it.

The Cholera observed in Russia, with equal uniformity presents the same symptoms as the Cholera of India.

Lastly, the Cholera of Poland has in like manner manifested the same character.

In India as well as in Russia, the Cholera is found pretty well defined by the following symptoms, by which we may always readily recognize it: epigastral pains, anxiety, vertigo, repeated vomitings, frequent stools; the matters discharged at first composed of recently ingested substances, but soon becoming fluid, whitish and flocculent; violent cramps, contractions of the superior and inferior extremities, coldness of the body; suppression of urine; the skin of the hands and feet pale, cold, moist and wrinkled; distortion of the features, hippocratic countenance; sinking and complete disappearance of the pulse, and total absence of vital re-action.

On this point, the symptomatology of the epidemic Cholera, there is no difference of opinion. In the East and West Indies, in Russia and Poland, the descriptions are every where identical.

Nothing, on the contrary, is more variable than the statements given of the necroscopic characters of the disease. Deep meditation upon a very great

number of autopsic examinations which we have closely investigated, lead to the following results :

1. The pathological lesions discovered after death caused by the Cholera, in India as well as in Russia and Poland, are slight, variable, dissimilar, and even discordant.

2. In a given system of organs, in the brain and its dependencies, in the digestive tube and its appendages, in the heart and the large vessels which proceed from it, these lesions have no fixed seat, still less have they a definite character.

3. In a great number of cases, the most scrupulous observers affirm that they have not found any appreciable alteration.

4. Very frequently also, the lesions described present no determinate character; they do not differ from those which are observed after death produced by certain acute diseases, by those especially which are remarkable for the dreadful rapidity of their progress and the suddenness of their fatal termination.

5. It has been generally affirmed that the more violent the disease, that is to say, the more speedy its fatal termination, the less sensible have been the pathological lesions.

6. The intensity of the various lesions found after death from the Cholera, have generally been in a direct ratio to the duration of the disease.

7. One fact, which has been pretty frequently attested in the pathological anatomy of the Indian Cholera, is the whitish cream-like matter adherent to the surface of the mucous membranes.

The Cholera, as to its nature, is a complex malady. It is a complication resulting from a general diminution in the energy of the nervous system and a particular catarrhal affection, combined in various degrees.

Either of these morbid conditions is susceptible of predominating to such a degree as to claim more particularly the attention of the physician, according to the constitution of the individual, the stage of the disease, &c.

The predominancy of the catarrhal over the nervous affection principally depends upon the stages of the disease, and *vice versa.*

In the first stage, the nervous affection usually predominates; in the second, the catarrhal state is most prominent.

Almost always, however, the two stages are united, blended, and confounded: with them are also combined and blended the phenomenal characteristics of the two pathological states. Then is it that the disease is elevated to its highest degree of intensity, and it is then that all the attention and all the sagacity of the enlightened observer are required in order to lay hold of the indications.

The disease is naturally very malignant: individuals deprived of the assistance of art almost invariably die. The chances of recovery are greatest when the physician arrives at the period of imminence or invasion of the disease, and when the method of treatment employed coincides with the special forms which the disease assumes in particular cases.

In several places ravaged by the Cholera, statistical summaries have been published, giving the relative number of cases, deaths, and cures, with the probable numerical chances of each of these terminations; but the data on which these numerical calculations are based, are so indefinite, that the Academy would not even assume the mere responsibility of the citation.

The logic of facts combine with the logic of the doctrines, to shew that we cannot designate an uniform treatment, and still less a specific remedy, applicable to all the cases of Cholera.

Individualities, which modify in a striking manner the morbid condition, exact a corresponding modification in the therapeutic agents.

The only general advice which we can give upon this point, must be summed up in the clinical indications. To rouse the depressed nervous energy, to augment and render its distribution more uniform

and regular; to stimulate and warm the chilled surfaces of the skin; to re-invigorate the vital powers; these are the predominant and capital indications of the epidemic Cholera.

Next to attack the catarrhal affection by the aid of such means as have been ascertained by experience to have been productive of the most successful results, constitutes another analytical indication of almost equal importance.

Lastly, to combat the symptoms, in a direct ratio to their urgency and relative predominancy, this is a secondary symptomatic indication, which is equally to be attended to.

The method of accomplishing this threefold purpose, must vary according to the individuality, the epoch of the epidemic, &c. It is only from the accurate perception and experienced tact of the physician, that we must expect those applications which may demand success.

The disease under consideration is remarkable and dreadful, beyond every other malady, in consequence of the fatal extensions which it has made. Taking it up from its commencement, the latter part of August, 1817, and carrying it down to the present day, the Cholera, arising in the Delta of the Ganges, has extended from lower Bengal, its cradle, to the isles Mauritius and Timor, near New Holland,

in the southern direction. Towards the east, it has appeared at Kussuchou, a Russian village, at Pekin and even eastward of this place. On the side of the north, it has gained the frontiers of Siberia and Astrakan as far as Archangel. Finally, on the west, it has attacked Moscow, St. Petersburg, extending its course from Dantzig to Olmutz; and slightly declining towards the south, it has accompanied the armies of Russia into the very heart of Poland.

The disease then has successively invaded an immense extent of country, in every direction of the horizon, during opposite seasons and in very different climates.

The disease, as is shewn by an immense majority of facts, is extended and propagated in the epidemial way, and especially under the influence of predisposing causes, the chief of which are: humidity, sometimes combined with heat, sometimes with cold; frequent atmospheric vicissitudes; large assemblages of men; the encampments and marches of considerable masses of troops; excess in eating and drinking; debauch, uncleanness, poverty; inhabiting low and damp situations; dwellings badly ventilated, or encumbered with men or animals; violent agitations of the mind; aliments and drinks of a bad quality, difficult of digestion and disposed to fermentation.

We may hope to be preserved from the disease by keeping aloof from the various predisposing causes just mentioned.

Notwithstanding the cholera, the history of which we have just traced, may be primitively and essentially epidemial, we may however infer from facts that, under certain circumstances, it can be propagated by the migration of individuals; and even though these facts may only be of value so far as they excite suspicions and give rise to doubts, yet are we in duty bound to take cognizance of them, and adopt corresponding precautionary measures: the prudence of nations demands it.

We have already noticed that the Cholera-morbus is very apt to follow in the train of large assemblages of troops, in consequence of the privations, fatigues and excesses which usually attend upon the life of a soldier.

We rejoice, Gentlemen, that the voice of humanity has at length been heard. You have now no cause to frame the wish, that Diplomacy, that European representation of the desires and interests of nations, should interfere in these calamitous circumstances. It is now proclaimed to the whole world: France, by the voice of her King, or the King, declaring the wishes of his people, "will en-

deavour to preserve the South of Europe from the scourge of the contagion which war propagates." It is, Gentlemen, from this circle especially, that the first acclamations of gratitude should ascend.

*July* 25, 1831.

(Signed)

KERAUDREN, *President;*
CHOMEL,
MARC,
DESGENETTES,
DUPUYTREN,
LOUIS,
EMERY,
DESPORTES,
BOISSEAU, and
PELLETIER;
DOUBLE, *Reporter.*

By the Academy,

ADELON, *Annual President;*
Bon. PORTAL, *Honorary & Perpetual President;*
PARISET, *Perpetual Secretary.*

ND OF THE FIRST PART.

# SECOND PART.

# REPORT

ON THE

# CHOLERA-MORBUS,

READ

13TH SEPT. 1831.

# REPORT

ON THE

# CHOLERA-MORBUS.

READ AT A GENERAL SESSION OF THE ROYAL ACADEMY OF MEDICINE, SEPT. 13, 1831.

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## GENERAL CONSIDERATIONS.

Among the most remarkable and dreadful phenomena of the Cholera-morbus, must incontestably be ranked the character of extension which the disease affects. Already has almost the whole of the continent of Asia been pervaded by it; a part of Europe is now found, either attacked or immediately threatened by this scourge, and we also have great reason to apprehend its cruel invasion. Having studied the march, symptoms, necroscopic characters, seat, nature, treatment, and terminations of this fatal malady, the Royal Academy of Medicine has specially directed its practical inquiries to the means of preventing it.

Here the prophylaxis of the disease, the duties and difficulties are spread over a widely extended field.

The civil authorities, the members of the medical profession, and citizens, will all have obligations to fulfil and precautionary measures to adopt. These obligations, and precautions must necessarily vary according to the nearness of approximation of the disease to a nation, or its actual invasion.

The advices then, which the Academy is called upon to give on this subject, will be arranged under two different sections, the one relating to the supposition that the disease is simply threatened, the other to its actual invasion.

These advices will also be addressed successively :

1. To magistrates of every class ;
2. To physicians of every order ;
3. To citizens of all conditions.

The object of these advices will be to specify in detail what each should perform within the limits of his duties, faculties, means and jurisdiction.

But let us proceed to declare in the first place :— France, fortunately, is not placed in either of the conditions embraced in the plan which the Academy has just traced.

Blessed with a most advantageous geographical position, a serene sky, temperate climate, fruitful soil and a happy distribution of territorial property, with industrious habits, instruction pretty generally distributed and, consequently, with a public and private hygieine which leaves but little to be de-

sired, the French have reason to hope that they will be preserved from the visitation of this scourge.

Besides, in general, the probabilities and especially the risk of propagation of Cholera beyond the limits of the localities actually invaded, always go on diminishing. The torrent seems to excavate a bed less broad and deep, in proportion as it continues to extend, and according as it attacks more enlightened and prosperous nations, especially those who pay strict attention to cleanliness.

What if, contrary to these anticipations, the disease should attack us, have we not every reason to presume that its force will be diminished by the hygieinic conditions in which we are found placed?

Let us again relate in few words what happened with regard to the typhus of 1814–15.

The disease had made extensive ravages in the two armies, both among the victors and the vanquished. The two banks of the Rhine had grievously suffered by it. The disease extended, though gradually diminishing in intensity, even to the borders of the Loire. Soldiers attacked with typhus entered our hospitals in great numbers. Many officers and servants also carried the disease into the different quarters of the city. The French, the inhabitants of the capital especially, endured with great irritation and impatience, the presence of the armies of occupation; yet notwithstanding all these distressing circumstances, the typhus could not es-

tablish itself amongst us. It became extinguished in the midst of the prosperity and comfort which the inhabitants of the capital and the central provinces enjoyed.

There is also the more propriety in insisting upon this consideration, in this place, from the fact that typhus, under certain circumstances, and especially since the Cholera has manifested itself in Europe, constitutes in some degree one of the terminations of this malady. Such facts, doubtless, also add to the chances of preservation which we enjoy.

Nevertheless, the extension to a distance of the Cholera, as it now reigns over several parts of Europe, is an incontestable fact; this enormous fact surely implies causes which are peculiar to it, and the knowledge of the causes of this phenomenon would be of immense benefit to mankind.

We may safely affirm, however, that the special manner in which the Cholera is developed, the essential cause of its extension, are entirely unknown to us; this is, at the present day, the most essential point to be illustrated in the general history of the disease; it is this which should be proposed to the investigations of learned men in every country. Upon other questions, which are connected with the pathology of Cholera, observation has not left us entirely destitute of guides and illustrations; we have notions, we possess data which are peculiar to this disease. But as to the mode of transmission

setting aside simple general ideas, we have yet every thing to discover, almost every thing to learn.

But, by way of retaliation, we do positively know that the co-union, the concurrence of a certain series of circumstances, singularly favor the disastrous march of this scourge. Such are great and frequent atmospherical vicissitudes; heat and moisture, and sometimes cold and moisture, combined; excessive and long protracted rains; uncleanness; assemblages of men; the abode of the sick in narrow, confined apartments which are with difficulty ventilated and encumbered with human and brute beings. Now, is it not evident that in these data, well attested, we must seek for the first rule which is to guide us in the adoption of sanatory measures?

On the other hand, it seems that the Cholera, especially since it has been transplanted into Europe, has in certain cases been communicated by the aid of hot-beds of emanation, in which the disease was as it were concentrated; for example, in consequence of extensive accumulations of men, and the crowding of patients together into unwholesome, ill-ventilated and filthy localities.

The Cholera, also, after the manner of all extensive epidemics, is most frequently extended and multiplied, by the influence of general occult causes, which are probably diffused through the atmosphere, the deleterious action of which is also found increas-

ed and favoured by the concurrence of the causes which have been enumerated above.

These constitute the most positive information afforded by physical and medical observations, regarding the causes of the extension of the disease: it is within these limits that the foundation of the measures required must be laid. Concerning sanatory measures, it is evidently from the mode of transmission and propagation of the disease that we must establish the nature of the precautions to be taken.

Quarantines become particularly useful against diseases which have a stated period of incubation and an equally fixed period of transmissibility, as is the case with small pox, for example; but with regard to the Cholera, there is nothing which proves that the disease has a fixed period of incubation, a determinate space of time during which the disease retains the property of transmission, and beyond which this property is extinguished and destroyed. Neither have facts attributed to it a limited sphere of action. Can we then reasonably establish preventive measures in the same degrees and forms as if we possessed the data in which we are deficient?

In epidemics similar to the one under consideration, the disease itself is perhaps not the most formidable scourge. The moral effect exerted upon the inhabitants, and its dreadful consequences, are not less to be apprehended. If we restrict commer-

cial relations too rigorously by quarantines; if we drive back populations upon themselves by means of military cordons; if we agglomerate the sick in lazarettos, we will precipitate the dreadful event, augment the misery, multiply the elements of production and the causes of the disease, and create new hot-beds of choleric emanations; and those measures employed, in all the good faith of *non-savoir*, in order to preserve nations from the disease, would on the contrary have a direct tendency to produce, propagate, and aggravate it.

In the numerous epidemics of Cholera which we have had occasion to meditate upon, both in Asia and Europe, patients placed in salubrious situations are visted, touched, moved, changed, dressed, and carefully attended, yet do not communicate the Cholera: physicians proceed to the examination of the bodies after death, dwelling long and minutely in their investigations, yet they have not contracted the disease. Numerous experiments have been made with the view of shedding light upon the manner in which the disease is transmitted: one has inoculated himself, has even injected into his veins the blood of individuals actually seized and even dying with the Cholera; another has inoculated himself with the mucous matters discharged by vomiting and by stool; another has rubbed his skin with the same substances; some have laid down in the same beds with cholerics and enveloped them-

selves in the clothes which these patients have just quitted, and others again have gone close to them in order to inhale their dying breath; yet always without serious consequences.

Far be from us, however, the rash thought of proscribing useful precautions, and condemning prudent measures. On the contrary, these useful precautions, we call for them, we plead for them with all our energy: but for the interest of commerce and society, we desire that the endeavour should be to keep these precautions and measures within just limits; we particularly desire that they should be applied with discretion. Directed by profound knowledge, and espccially by the light of experience, they will profit nations without being a burden to them. To individual calamities, to the eventful misfortune of disease, they would not add the universal calamities, the infallible misfortune of poverty, a scourge more formidable still than the Cholera.

It is with a very correct perception of what is right, and a very proper concern for his triple responsibility as a man, citizen and magistrate, that the minister invokes, in this perilous conjuncture, the illumination of science and the knowledge which flows from observation. Under such circumstances, it is not merely necessary that the impression made should be powerful, but it is particularly necessary that it should be just.

## INSTRUCTIONS

TO

## ADMINISTRATIVE AUTHORITIES,

IN CASE THE DISEASE IS THREATENED.

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What is the conduct to be observed by the government provided the disease is threatened? What should it direct in case of its invasion?

One measure which prudence recommends before every other, is to cause the frontier towns to be medically and carefully inspected, in order to make known, with perfect exactitude, and at every instant the occurrences there taking place, both in relation to the sanative state in general, and the Cholera-Morbus in particular. The journals, without examination or remark, spread news, which are not the less alarming though on the morrow proved untrue; too often do they exaggerate disturbances, in order to add interest to the recital.

With the view of obviating such serious inconveniences, enlightened and prudent physicians should instantly be attached to the embassies and legations of the neighbouring countries

already suspected or even attacked; such a measure, adopted immediately, would be of the greatest utility. Through the daily correspondence of these physicians, the government would receive documents in which might be placed a degree of confidence proportionate to the discrimination observed in the choice of the physicians.

Such a choice, therefore, should not be deputed to individuals who are strangers to the medical profession. With a constitutional government in which the responsibility of ministers should likewise be a practical reality, with the elective system by which we are governed, learned bodies combining the necessary information for judging correctly, should be exclusively consulted under such circumstances.

Boards of Health should be instituted in the departments, especially in places bordering on infected or suspected countries. France, in this measure, would find an additional source of observation and preservation.

Let the government prepare in advance, places of observation and the depots to be established in case of actual menace: to it the duty of performing belongs, it is ours to advise. When pressing occasion for lazarettos and quarantines

shall be truly felt, it should not be taken by surprise.

It is quite natural to suppose that, from the force of circumstances, these different precautionary measures will be first adopted in some part of our frontiers. It is absolutely necessary that sanatory cordons should be vigilant, complete, and faithfully observed. But, on this subject, the Academy would carry its provisions still farther: an intimate conviction and unanimous assent induce us to declare, that it is only upon the frontiers of states attacked or even simply suspected, that the preventive measures of sanatory cordons should be established; applied to the interior, these means of sequestration would be useless and dangerous. It is proper for us to sequester foreign nations, who might bring the Cholera to our doors; but should the disease be declared among us, let us, like true brothers, instead of abandoning one another, afford mutual assistance.

If, in spite of the measures taken on the frontiers, the disease should reach us, it will then have arrived by the epidemial way; and then, the hygieinic are the only admissible means: every means of sequestration would be superfluous.

Sanatory cordons upon the frontiers would pos-

sess real utility, and be of pretty easy application, without presenting the disastrous inconveniences attendant upon them, if they were compacted or circumscribed towards the interior, and if, for example, they sequestered one department from other departments, one city from another city, or even one quarter from another quarter.

Warsaw and its environs have exhibited striking examples of the fatal consequences occasioned by useless sequestrations from city to city, from town to town, and from family to family.

Persons attacked with the Cholera should be disseminated over large spaces, and placed in elevated, dry, and freely ventilated habitations. Let the administration take its precautions before hand. Each threatened city should have one or several hospitals for Cholericks, according to its population: it would be still better to establish these patients in barracks, or even under tents, if the season should permit. These establishments, whatever they may be, should be placed on elevated situations, at a distance from large evaporations from rivers or lakes, in the midst of an open country, upon a soil entirely exempt from humidity, and otherwise purified by every possible means.

And as examples of relapses are frequent, especially when the patients remain in the midst

of influences capable of developing the disease, it would be essential to have houses of convalescence, places of refuge, for the benefit of individuals too recently cured to return to the bosom of their families, or re-enter the precincts of cities. It is requisite that a certain space of time should elapse between the moment the convalescent leaves the seat of diseased emanation and the period he sets out to mingle with the rest of society.

As it respects general precautions, the regimen of hospitals, the interior of prisons, extensive work-shops and manufactories, colleges, large boarding-houses, and masses of troops, require much more rigid inspection than is customary. In the wards of hospitals, let the beds be placed at a greater distance asunder, and cleanliness be more strictly attended to; let scrubbing of tiled floors be interdicted, the humidity resulting therefrom would be pernicious; let the encumbrances of the different houses of detention be diminished, and their purification be strictly enforced; let the crowded state of work-shops be prohibited; let the caserns be supervised; let the soldiers bathe as frequently as possible, their winter pantaloons be given them early, their body-linen frequently changed, a little wine be distributed to them, together with a rather more abundant supply of meat and a little less of vegetables,

and let still greater attention be paid, if it can be done, to the general health of the troops which may then constitute the different cordons of observation. All these precautions will be productive of the most beneficial results.

Among the various points of public hygieine which demand special attention, under the supposition that the Cholera is simply threatened, we would specify sinks, common sewers, wells and, in the country, dung-pits. The sanatory police should take such precautions that, during the epidemic, if it should reach us, no operation of draining or cleansing common sewers or sinks, or of purifying wells, should be undertaken: these different works, incapable, doubtless, in themselves, of producing the disease when it does not exist, might increase and aggravate it, if it did exist.

Pools, marshes, rivers, the standing water in which hemp is rotted, and water used for domestic purposes, should, in case the epidemic makes its appearance, attract additional solicitude.

There would be rather an advantage in expending a little less in the construction and support of lazarettos, the establishment of quarantines, in the sanatory cordons, in the appointment of directors, administrators, and sub-officers of the public health, and on the other hand, disbursing more towards

promoting both private and public salubrity.

Moderate labour is always consistent with the enjoyment of health. For this reason, that species of labour which would tend to make the labouring classes comfortable, would be a good preservative against the Cholera. It would be still more so if the object of this labour is to add to the general salubrity. Hence, the Academy suggests to the local authorities the propriety of immediately undertaking the construction of works of general utility, and especially such as may promote public salubrity among unhealthy communities.

The administration should also ascertain that the tenements of the poor be provided with a sufficient number of apertures, in order that they may be properly purified.

Of all the modes of transmission, heretofore mentioned, of which the Cholera is susceptible, the epidemial mode is the most common and evident. Consequently, it is reasonable to direct some of our precautionary measures towards this point.

The communication of Cholera through the medium of persons, or patients, affords serious and just subject for apprehension. Against them, therefore, proper sanatory measures should likewise be employed.

The extension of the disease by means of merchandise, being of all modes the most contestable

and the least averred, it is not just to coincide with all the views of the administration upon this point. Besides, excessive measures directed against commerce, would have the inevitable inconvenience of presenting additional allurements to smuggling, and consequently favour and increase the disease. Now, smuggling, which is naturally composed of persons and things, that is to say, of individuals who carry it on, and of merchandise in favour of which it is carried on, would necessarily become one of the most formidable modes of extending the Cholera.

It would especially be necessary, with regard to the Cholera in particular, to draw up a new distributive series of suspected or susceptible merchandise, as directed by the ordinance of September, 1821. Every communicable disease has special laws of transmission; each must therefore have a different series of conductors, by the aid of which it is more readily extended. Articles declared suspicious, with respect to the plague, might not be so in the same degree, and probably not all, where the Cholera is concerned. Let us add, that the tables annexed to the ordinance of 1821, considered even abstractedly of the Cholera, present incongruities and anomalies, which the physical and chemical sciences reprove, and which it is indispensable to abolish.

It would be wise to provide for the general subsistence, in case of the proximity of the disease. It would especially be prudent, under such a circumstance, to give guaranty and security to the numerous inhabitants of large cities.

## INSTRUCTIONS

### TO THE ADMINISTRATIVE AUTHORITIES, IN CASE OF INVASION OF THE DISEASE.

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Having given such instructions to the authorities as are applicable to the disease when merely threatened, let us now proceed to mention what would be requisite if the Cholera should come to reign amongst us.

To insure a just distribution of medical assistance among individuals in destitute circumstances;

To see that patients are visited and succoured promptly: here success entirely depends upon the means which may have been adopted in the first moments of invasion of the disease;

To prevent several patients with Cholera from being collected in the same chamber, or even in a narrow, ill-ventilated apartment, and encumbered besides with other individuals even in a state of health;

To supervise, with extreme rigorousness, the cleanliness of the streets, the sweeping and washing of markets, the cleansing of slaughter-houses, the

purification of sewers: to afford facilities to the indigent of bathing occasionally, twice a month, for instance, and also the means of changing conveniently their body-linen. It is necessary, however, to recommend them to use precautions, both with respect to baths and frequent changes of linen, so that neither the one or the other of these means shall leave on the body prolonged humidity;

To forbid, in general, all numerous assemblages of people, whatever may be the motive. Experience has proved that the collection of considerable multitudes has resulted in increasing and aggravating the malady;

To change provisionally the organization and distribution of markets; it would be well, especially, to divide and multiply them considerably, to locate them quite near the barriers, and in very open situations;

To evacuate all caserns situated in the interior of cities, and to encamp the troops in salubrious positions and at suitable distances;

To purify the chambers in which sick persons have resided, either by the aid of lotions of chlorure or by means of Guytonian fumigations;

To regulate, especially, the inhumations by the advice of the members of the profession. It will be necessary to maintain an even balance between inhumations too precipitate and inhumations too

long retarded: the former would be dangerous to individuals, in a disease in which death arrives so suddenly and often in the midst of syncopes which may for a greater or less length of time simulate death; the latter might be dangerous to communities during the prevalence of an epidemic, in which experience teaches that, uuder certain circumstances, every patient may become a hot-bed of choleric emanations. The rules to be laid down in like cases must vary according to the intensity of the epidemic and also according to the epoch at which the epidemic has arrived. The conduct may be different, at the invasion of the epidemic, during its greatest intensity, and in its decline; it may vary also in those moments of enervation, which is sometimes observed in the geographical march of the epidemic, independently of the variations connected with the epochs we have just enumerated. In all cases it would be a wise precaution to sprinkle lime upon the bodies of the dead when prepared for sepulture.

## INSTRUCTIONS TO PHYSICIANS,

### IN CASE THE DISEASE IS THREATENED.

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Epidemics, in the medical history of nations, are events of grave importance. It is important that their history should be recorded, that their remembrance should be perpetuated, in order that the direful lessons of these calamities be not lost to succeeding generations. Let us add, that, in the midst of these disasters, the progress of the science is powerfully facilitated, and physicians find brilliant opportunities of confirming the importance of their services.

The epidemic Cholera has presented, in the regions which it has traversed, notable variations in relation to its duration, severity, and the consequences which have resulted from it. If we are doomed to experience its ravages, it is necessary that physicians, in the various points in which it may manifest itself, turn to the best account the fatal advantage which they have had of studying it: in order that the experience of those nations who have already observed it may prove

profitable, we have, on our part, exhibited this terrible scourge under all the modifications of which it is susceptible.

The duties of physicians will vary according as populations are merely threatened, or actually invaded, by the Cholera.

In times of anxiety, when citizens are constantly in dread of the epidemial invasion, the physician, always calm, should apply himself to the deep study of this disease, in order that, if the dangers be realized, he may not enter altogether as a novice upon the career which the Cholera, reigning with more or less fury, will open to him. Epidemial times are days of dread and disorder; every thing is then done with precipitation; tumult and consternation prevail: it is in moments of perfect tranquillity then that we must prepare for all these scenes of agitation and distress. In every thing, it is advantageous that the observer possess some anticipated notions of the objects which may be presented to his view. We study with greater advantage the phenomena of which we have been forewarned: those which come upon us unawares, confound, and often escape us.

Among the works upon the Epidemic Cholera, which the Academy would advise as most useful for perusal and study, it would cite the treatise of

Annesley, that of Jameson, of Turnbull, Christie, the treatise of Lichtenstaet, the particular observations and four decades of cases, of M.M. Jachnichen and Marcus; and as these different treatises, published in the German and English languages, have not been translated into our own tongue, the Academy does not hesitate to recommend the reading of the report which it has published on this subject, by invitation of the government. Notwithstanding the works of M. Deville, of M. Keraudren, M. Larrey, and some others upon the Cholera, the French physicians have not yet published any thing complete on this subject.

We are aware that, up to the present time, there are scarcely any among the French physicians who have had an opportunity of observing the disease.

The physician who may have some well-founded apprehensions of the proximity of the Cholera among the people whose health is confided to his care, should immediately apply himself to the minutest investigation of the topographical conditions which surround him; he should seek to ascertain, in all their statistical details, the elements of the population in the midst of which he is employed. Still later, by the aid of these preliminary data, he will be enabled to fix with precision the number of patients compared with the total

population, and the number of deaths relatively to the number of sick; to determine the classes, professions, sex, ages, and constitutions, which have been spared or attacked, cured or fallen victims.

By means of preliminary statistical observations, he will avoid confounding with individuals actually attacked with the Cholera the number of diseases of a different nature which, during like seasons of the year, usually manifest themselves in the country. He will distinguish also, in the lists of mortality, the deaths happening in consequence of Cholera, from those which, at the same epochs of the year, and in ordinary times, occur among the inhabitants of the country in consequence of diseases of a different nature.

The physician should try to extend very far this species of study of medical topography and statistics. In the number of useful consequences which would result from this order of investigation, he will be eager to state to the administrative authorities the ameliorations, which, in this particular circumstance, the public and private hygieine demand. He will ascertain the sanatory state of all numerous assemblages; he will direct the local administrations where they should place those *choleriques* who will not, or cannot, be treated in dwelling-houses; he will

also endeavour to have a house of convalescence prepared before-hand; he will especially inspect the daily occurrences in hospitals; he will visit with more than ordinary attention, jails, prisons, the caserns, colleges, and extensive work-houses.

It would be a matter of high importance to study the sanatory state of various species of animals, previous to the epidemic, during its continuance, and after its cessation. It would be well to note the differences presented by the animals appertaining to the country and those which are merely temporary; but he should study more particularly the diseases of domestic animals, of those especially which share with man the labours of agriculture, and which constitute a great portion of the riches of rural economy.

# INSTRUCTIONS TO PHYSICIANS,

## IN CASE OF INVASION.

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It is especially under circumstances of invasion of the disease, that the obligations of the physician assume a highly important character. It is incumbent upon members of the profession, to employ that influence which knowledge gives them, and that consideration which appertains to their station, in controlling the moral of the families whose confidence they have acquired. They should be instructed as to the real dangers of the disease, the nature of the precautions to be observed with the view of avoiding it, and the means which it is necessary to employ in order to obtain its cure. Here, every physician may more easily adopt the modifications required by the different constitutions upon which he may be called on to act.

In general, when called on to study an epidemic, we will not be excusable if we neglect the collection of a certain number of cases. These cases should be numerous, varied, complete: they should present isolated facts of the disease, considered in the total

duration of the epidemic, from its commencement, during its greatest intensity and at its close: they should also embrace the different modes of termination which the epidemic experiences. With the cure, they should make known the methods of treatment which have been most successful at each epoch of the disease, considered in general: with the fatal termination they should give the general results of the cadaveric lesions, observed also at different epochs of the epidemic, that is to say, at its invasion, towards its middle, and during its decline.

When the disease has manifested itself, the physician should endeavour to fix the epoch of its appearance, and determine the precise moment of its developement: he should ascend to the first individual actually attacked, and satisfy himself as to the circumstances under the influence of which this individual was seized. In the same manner he should observe with particular care the first patient attacked by the epidemic, inform himself whether the disease exists throughout the neighbourhood, or if the epidemical fiend has appeared in certain places only: he should also try to discover the manifest state of these differences.

In the same manner he should trace the progress of the disease throughout all the patients who may have been successively attacked by it, and under the diverse circumstances of localities, approxima-

tions, relations, and communications which have conduced to the extension of the disease. He should draw up a species of geographical chart of the epidemic; trace its itinerary; arrange its genealogy, and thereby follow it step by step from the first to the last, and from its feeblest impressions to its most disastrous desolations.

He should endeavour to institute a comparison between the medical topography of the places where the disease took its rise, the topography of the countries wherein it has been most easily established, and the topography of the neighbouring territories which the Cholera has not pervaded.

He should try to find out the conditions and causes of these differences, under the three following points of view:

1. The countries which have been violently and repeatedly attacked;

2. The places which have been but partially and transiently visited;

3. The territories which have been completely preserved, either fortuitously or by the intervention of certain sanatory measures.

The main points which he should endeavour to elucidate, are embraced by the following questions:

How does it happen when one is placed far from the centre of the disease, without the sphere of its action?

Can an individual attacked with the Cholera, and transported to a distance, transmit the disease to other persons in the midst of conditions otherwise generally salubrious?

In case of the affirmative, what are the circumstances which favour this transmission? What, on the contrary, are those which retard or prevent it?

Can an individual in good health, from the sole circumstance of having lived in the midst of diseased populations, carry the disease with him in travelling? What are the known conditions which augment or diminish this property of transportation?

Can persons who shall merely have traversed countries where the Cholera reigns, without being attacked by it, become loaded with emanations from the disease, and thereby transport it to other places?

An individual labouring under the reigning Cholera, transferred far from the region where the disease originated, does he acquire greater chances of cure than if he had remained in the place where attacked?

A family, a body of soldiers, any assembly of persons whatsoever, among which the Cholera reigns, do they succeed in divesting themselves of the disease more speedily by removing from the place where the scourge had assailed them?

Different substances in the immediate use of cholericks, such as bed-clothes, matresses, body-linen, tissues, garments, &c., carried to a distance from the hot-bed of the disease, do they preserve for a greater or less length of time the capability of transmitting the Cholera to persons who might make use of them or who should only have occasion to handle them?

Other articles worn, touched, preserved, by patients, such as moveables, books, papers, jewels, can they transport the disease far from the seat of action and beyond the conditions capable of giving rise to a new epidemial region?

Can animal, vegetable, or mineral substances, alimentary or other substances which have merely had a place in the country where the disease reigns, and have not been touched by the sick, transmit the Cholera to a distance?

Living animals, whether domestic, or cattle, which have remained in the country where the Cholera prevails, can they, by change of place, carry with them the property of communicating the disease?

The solution of these questions, we may briefly observe, is arduous, and the attempts to solve them would be perilous. Therefore should we be content with collecting and turning to advantage the fortuitous circumstances which, arising during the

course of the disease, either from generous devotedness or adventurous calculations, might furnish, in this respect, some invaluable documents.

There is another series of questions, which might be more easily answered, and the essays for their solution would be void of danger.

We should endeavour to ascertain whether, in consequence of large assemblages held in opposition to the laws, the extension of the disease has been favoured; we should examine how, in such cases, the disease has affected the inhabitants of different communities, after a fair, a market-day, or a public festival.

At what epoch has the Cholera appeared in the country, and how long has it reigned there?

After having entirely quitted a country, has it sometimes re-appeared, and under what peculiar circumstances has it thus appeared the second time?

What was the general state of the atmosphere some time previous to the appearance of the disease, then during its reign, and also at the epoch of its cessation? A summary of the barometrical, thermometrical and hydrometrical observations during these intervals should be given. Electrometrical observations if they could be conjoined, would also have their importance.

What direction of the horizon does the Cholera seem disposed to pursue, in traversing a country?

During the prevalence of the Cholera, has it been noticed that there are any conditions of persons more subject to its attacks than others? if so, what were the circumstances of locality, profession, regimen, habit, age, sex, and fortune which seconded or opposed the invasion of the disease?

Is there one period of the disease in particular? is there one epoch of the epidemic in general in which the extension is most facile and most prompt? This faculty of extension, does it seem to be established in a direct ratio to the violence of the general disease?

Have we any reason for deciding whether the disease has always extended in the epidemic way or whether it has been propagated by emanations around the sick, by migrations of persons, or by transportation of merchandize?

Have we remarked that the Cholera exercised any influence upon intercurrent diseases spread over the country, and what was this influence?

What are the data relative to the number of deaths in a stated population, and to the proportion of cures and deaths among a certain number of individuals attacked?

What method of treatment has most generally proved successful?

What modifications is it necessary to make in the treatment at the different epochs of the epidemic, at its invasion, its most intense period, and decline; and also in those periods when we know that the epidemic Cholera, independently of the periods of time we have just indicated, presents movements, either of exacerbation or declension, which disconcert the most attentive observers?

Between patients who have received the assistance of art, and those who have been left to the efforts of nature alone, what has been the difference in the proportional number of deaths and cures, and also the difference in the celerity and stability of the cure?

Have we been able to form a decisive opinion upon the general effects of opium, calomel, sulphate of quinine, sub-nitrate of Bismuth, musk, oil of cajeput, ammonia, and of certain other medicinal substances?

Has blood-letting in general been productive of good effects? and, in the number of individuals submitted to venesection, are there many in whom the blood would not flow? Under the influence of what circumstances has this phenomenon been noticed?

Have we heard that physicians or the public have had successful recourse to any new remedy?

What have been the most ordinary consequences of the disease, as to its consecutive effects upon different constitutions in severe cases, when the disease has not terminated by death?

Have there been any examples of relapse or second attack after a well established cure?

Can we determine whether the disease, by its general influence, appears to leave in the constitutions of individuals any important modification?

What are the general results of autopsic examinations made at different epochs of the disease, in particular and in general, and also at the different periods of intensity of the epidemic?

As soon as an example of epidemic cholera presents itself to medical observation, the physician should inform the competent authority and at the same time request the opinion of some one of his brethren. This measure, both for the interest of the science and humanity, should be taken without bustle or eclat; but should the physician, impelled by an excess of zeal, be in too great haste to declare the existence of epidemic cholera, let him be on strict guard against any mistake. Violent colics and diarrhœas, gastro-intestinal irritations which frequently prevail during the autumnal season, and which, though they may be somewhat analogous to cholera, are not cholera, might easily lead to error. We know too well that epigastral anxieties, vomit-

ings, diarrhœas, and even contractions of the limbs are connected, though in slight degrees, with the diseases just enumerated.

Neither should we confound epidemic cholera with sporadic or indigenous cholera, if we may use the expression. The latter, which is observed almost every where and at the same time with the diseases of summer and autumn, is less acute, less violent and fatal: it never passes beyond a certain extent of country, and attacks but a very small number of persons at the same time.

The description of the symptomatology of the cholera may be recapitulated as follows: physicians will easily recognize it by these characters:

Epigastral pains and anxieties; repeated vomitings; frequent stools; the matters voided consisting at first of recently ingested substances, soon appear fluid, whitish, flocculent; violent cramps in the superior and inferior extremities; coldness of the body and abdomen; suppression of urine; the skin of the extremities, of the feet especially, pale, humid and wrinkled; tongue white, moist and cold; peculiar expression of the countenance; distortion of the features, hippocratic face; respiration scarcely perceptible; sinking and disappearance of the pulse.

Now, as it concerns the treatment, we may say in general, that, in the first period of the disease, which is characterized by coldness of the sur-

face of the body and concentration of the vitality internally, we would advise frictions, either dry, or compound; the radiation of caloric to the surface, by every appropriate means; warm covering; vapour baths, various rubefacients, cuppings, sinapisms and blisters.

It is also with the view of bringing back the circulation to the circumference, in very young persons of a robust constitution, that bleeding has been happily employed at the period of imminence and as near as possible to the moment of invasion of the disease.

In this period, may also be administered internally and with advantage, very warm aromatic infusions; such diffusible stimulants as the irritability of the stomach will permit; aromatic oils combined with alcohol and in conjunction with laudanum, ether, ammonia, James' powder, Dover's powder, &c.

The special alteration of the gastro-intestinal mucous membranes has been combated by calomel, rhubarb, aloes, magnesia, either separately or in combination, giving them according to the indications furnished by the individual constitution.

At the nervous period, with typhoid tendency, and even with mutations or transformations of the cholera into typhus—cinchona, musk, valerian, bis-

muth, camphor, and oil of cajeput have been given, together with such other means as are generally adopted in the-treatment of typhus.

With the view of attacking the prominent symptoms of the disease separately, there have been given,

For the purpose of arresting the vomitings, Riverious' draught, opium, cold drinks, and ice ;

Against the frequency of the stools, injections containing laudanum into the rectum, aromatic frictions upon the abdomen, and sinapisms ;

Against the pains and contractions of the muscles, frictions with the oil of turpentine, or oil of cajeput ; and these means have appeared so much the more efficacious, when they concurrently tended to warm and stimulate the chilled surfaces of the skin, and rouse the diminished energy of the nervous function, so remarkable in this disease.

As for the rest, concerning the further description of the nature and treatment of cholera, the Academy begs leave to decline more ample details, referring the reader to what has already been mentioned on this subject in the first part of the report.

The Academy would again insist upon the necessity of urging the employment of therapeutic means from the commencement of the disease. In this respect physicians should have an understanding

with one another, and also with the administration, in order that they may be multiplied on all points, so that patients may readily obtain that immediate assistance of which they stand in need.

In order that the assistance which persons in embarrassed or indigent circumstances require may be particularly expedited, it would be adviseable to tó augment the number of physicans and surgeons attached to benevolent institutions.

It would be desirable that every physician should be compelled to certify the precise nature of the disease which has occasioned death, whenever this deplorable event takes place. This would be the only means of ascertaining the actual number of victims in the course of the epidemic.

Under circumstances so urgent, and where the life of the sick depends upon the promptitude and opportunity of succour, physicians should consider themselves under a religious obligation to carry into the exercise of their art much more eagerness than is usual in ordinary times. In the night as well as the day, at long as well as short distances, they should always be ready. The business on hand is not to snatch here and there a single victim from death; no, entire populations must be plucked at once from the very jaws of destruction. Physicians impressed with the vast importance of the mission

which is confided to them, should rouse up all their energies; they should possess that courage which the precariousness of their station demands; and the courage of the physician consists in braving the dangers of disease in the midst of epidemics, even as that of the soldier impels him to brave death on the battle-field.

## ADVICE TO CITIZENS,

### IN CASE THE DISEASE IS THREATENED.

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The duties of the administration and the functions of physicians, under the two-fold circumstance of menace and invasion of the disease, are, as we have just seen, difficult and laborious.

In the midst of these conjunctures, the first obligation on citizens, is to endeavour to second, with all ardour, the administrative authorities and physicians in the important task which is imposed upon them. It does not require a great effort of reason to prove that, in similar circumstances, the safety of society is the supreme law, and that in order to succeed in saving entire communities, every individual should sacrifice a portion of his time, his fortune, and even liberty. This concurrence of all parties, always so easily excited among Frenchmen, should not be wanting in these calamitous times, if need should be.

Experience has proved it more than onee :—in epidemics, disorder and tumult add to all the dangers. The disease gains upon a greater number of individuals ; the symptoms acquire greater intensity ;

assistance is more difficult and less efficacious, and the mortality acquires a dreadful increase. Let, then, the citizens associate with the public authorities in order to prevent disasters upon disasters. At all periods, public order and general tranquillity, are essential to the enjoyment of prosperity and happiness: in times when epidemics reign, order and tranquillity are the only efficacious means of preservation and safety.

So long as we are merely threatened with the invasion of the disease, it is scarcely necessary in France, where a good hygieine generally exists, to deviate from the ordinary mode of life. Indeed, there would be an advantage in making no change in the general habits, at least with respect to persons who are in perfect health, and accustomed to live in a temperate and regular manner.

# ADVICE TO CITIZENS,

## IN CASE OF INVASION.

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But should the disease burst forth, a more than ordinary attention to cleanliness, personal as well as domestic, would naturally be a prime object of importance.

The constant use of dry and aromatic frictions, of baths slightly stimulating; of sufficient exercise, falling short of great fatigue, and every other means capable of supporting the proper performance of the function of the skin, will be of great utility.

It will especially be necessary to avoid suppression of the perspiration, chilliness, exposure to humidity, to rain, and to the inclemencies of the atmosphere, especially those which the night brings on.

Let the body, especially the loins, abdomen and flanks, be constantly covered with flannel, worn immediately next the skin; let the feet, by every appropriate means, be guarded from cold and dampness: coldness and humidity of the feet are among the most frequent causes of derangement of the intestinal functions.

We should equally endeavour to maintain the digestive functions in a favourable disposition; it would be well to find in the nature of the aliments, and perhaps also in the selection of certain accessory medicinal substances, slight tonics and diffusible stimulants, in strength proportionate to the necessities of different individual constitutions. An aliment, almost exclusively animal, would, by the title of preservative, have a salutary effect. Beef, mutton, game, eggs, wheat bread, fresh vegetables, in small quantities, and water coloured with a little wine, these are the general bases of every salubrious aliment. It would be proper to avoid meats not sufficiently cooked, smoked meats, salt provisions, salt fish, pastry, aqueous and crude vegetables, and unripe fruits.

Of all drinks, very weak wine and water is the most suitable; or what is still better, wine diluted with four times its quantity of the mineral waters of Bussang, Saint-Pardoux, Saint-Gondon, and Seltz. Weak cold infusions of quassia, hops, balm, odoriferous vervain, &c., might be substituted for the mineral waters.

Upon all occasions, spirituous drinks and every excess of the table should be avoided; an indigestion, even slight, during the reign of the Cholera, is almost sure to produce the disease.

The abuse of wine, brandy, and spirituous liquors, almost inevitably causes the Cholera: we

cannot too often repeat this to persons who are in the occasional habit of committing such excesses.

It has been observed in the countries where this disease has prevailed, that all individuals placed within the sphere of its action, have had the constitution modified in such a manner that a more or less remarkable diminution of the cutaneous and digestive functions was always present. It would consequently be essential, in case the disease is threatened, to anticipate this general impression and prevent its developement.

Every person living within the sphere of activity of the epidemic region, who escapes the Cholera, experiences, nevertheless, though in various degrees, the disagreeable influence of this epidemic. This influence is betrayed, in communities invaded, by a general uneasiness, frequent vertigo, exhaustion carried even to syncope, pains in the stomach, constipation, borborygmi, anorexia, loss of appetite, and a gentle diarrhœa; in a word, by an universal disturbance of the intestinal functions. This influence, extended to a higher degree, is also made manifest by those spontaneous lassitudes, and that annihilation of the muscular powers, which so frequently indicate the imminence of grave diseases, of those especially which appertain to nervous fevers rather than to inflammatory diseases.

Under such a modification of the public health, individuals seized with indisposition, even slight, should hasten to obtain the advice of a member of the profession. In medicine, as in morals, it is more easy to prevent the evil than to cure it; and for this reason, the resources of medicine are particularly efficacious against that state which is no longer health, and which is not yet disease.

As soon as the first symptoms of the disease are felt, and whilst waiting the arrival of the physician, an effort should be made to re-animate the enfeebled vital action, and excite warmth in the cold surfaces of the body by every means at command. Aromatic, or even spirituous baths, with the precaution of drying and warming the body well after the bath; the radiation of caloric over different parts of the skin, by passing a heated iron, for example, at a certain distance from its surface; sinapisms repeated in sufficient numbers, and many other analogous means, will fulfil this first object.

Internally, a warm aromatic infusion, a few drops of ether on sugar; a mixture of two drops of the essence of mint, and one drop of the tincture of Rousseau* in a spoonful of sugar

* A preparation in which one grain of opium is contained in six drops of the tincture.—Tr.

and water; four or five drops of the oil of cajeput, in half a spoonful of mint water, and a spoonful of the syrup of ether. A draught of cool lemonade, or even some pieces of ice in the mouth, might allay the vomitings. All these means might be employed with benefit while waiting for the preparation and administration of the special prescriptions of the medical adviser.

Frictions with alcohol and the essence of turpentine, with the oil of cajeput and spirits of camphor, would, for the time, afford relief to the pains in the limbs.

What we have also mentioned, in addition, respecting the treatment of this disease, will serve as a further guide to direct persons who are sufficiently intelligent to know how to profit by them.

Let persons who do not inhabit dwellings sufficiently pure for such a state of disease, or who may not be sure of obtaining at home the requisite assistance, hasten to the establishments which the administration shall have prepared for the purpose. From calculations made in Russia, it has been ascertained that, by comparing individuals in embarrassed circumstances who have been attended at their own dwellings with those, of the same class, who have been admitted into the salubrious establishments set apart for them, the advantage has been immense on the side of the latter.

Among them the disease was of shorter duration, the pains were less acute, the symptoms less violent, and the recoveries more numerous and prompt. For the cure of this disease, simple or compound baths, and aromatic vapour baths, are often required, and such means of assistance are not easily obtained in private domiciles.

The epidemic Cholera does not attack all individuals without exception who are found placed within the sphere of its influence; it is necessary, in order that the attack be realized, that there should be a particular disposition of the body, a determinate aptitude for contracting it. This predisposition, this aptitude, is eminently incurred by fear, uncleanliness, excesses of the table or of any other kind, the abuse of wine, brandy and cordials, exposure to cold and moisture; and, on the other hand, it is by avoiding these general causes of insalubrity, that the Cholera is prevented. This special predisposition, this susceptibility, exclusively of the circumstances which we have just enumerated, is wanting in a great number of individuals. It is daily diminished, moreover, in proportion as the epidemic extends to those communities who pay great attention to cleanliness, are more enlightened, and suffer least from the pressure of poverty.

We read, every day, in the political journals, of newly discovered remedies and specifics for the pre-

vention and cure of the Cholera. The public should always be on their guard against these deceitful promises of preservation and cure: the least inconvenience they can produce is to give false security, and distract the attention from the use of those means which prove decidedly beneficial. If experience should make known remedies more generally efficacious than those with which we are already acquainted, if it should discover any decided preservative, the Academy will not delay to give official notice of it to the public.

By the title of preservative, we would advise, in addition to what we have already mentioned with regard to cleanliness, the frequent washing of the hands with a weak solution of the chlorate of lime, in the proportion of one part of chlorure to one hundred parts of water. We may in like manner employ all the disinfecting chlorures; frequent or even continued fumigations with the vapour of chlorine, by means of the different apparatuses to be found in trade, or even without these apparatuses, by directly disengaging the chlorine from the chlorures by means of vinegar.

We must however use them with prudence and intelligence; we might, by being too lavish of them, give rise to injurious super-excitement.

After the epidemic has ceased, be very cautious how you entirely suspend preventive measures;

facts, in great numbers, attest that the disease has been re-produced in the same place, even with greater violence and intensity than at the primary invasion. It is also necessary to submit to a more or less protracted convalescence, and to a regimen more or less severe, the countries which have just been released from the Cholera. The duration of all the other conditions of this convalescence of places, if the expression may be used, should be regulated by the members of the profession, who will themselves take advice from circumstances actually dependent upon the epidemic.

Extensive cleansings of the interior and apartments of houses, after the epidemic, whitewashing the walls, and washing the curtains and moveables, will constitute so many measures which, if adopted, will incontestably prove beneficial.

Often, after the epidemic, in individuals who have been attacked by it, and sometimes also in those who have merely experienced the epidemial influence, of which we have previously spoken, we remark a want of tone, a considerable alteration in the gastro-intestinal functions; evident derangements of digestion, diarrhœa, dysentery and obstinate constipation; attesting the great ravages which the epidemic cholera has made upon the constitution: such affections of the health demand great attention.

It is by means of the fertile instructions of observation, derived from the most correct sources, and the mighty power of the accumulated experience of the most authentic facts, that we have obtained the different periods of the epidemic, its simple menace, its actual invasion, its decline and disappearance.

The Academy, fully convinced of the vast importance of its commission, has neglected nothing that could elevate it to the utmost height of its duties. Each member, from the zeal which he has shewn, whilst the threatened danger is yet at a distance, has fully manifested what efforts and talents he will display, should he be called on to attack it.

*Sept. 13th*, 1831.

(Signed)

KERAUDREN, *President;*
CHOMEL,
MARC,
DESGENETTES,
DUPUYTREN,
LOUIS,
EMERY,
BOISSEAU,
DESPORTES,
PELLETIER,
ITARD,
DOUBLE, *Reporter.*

By the Academy,

ADELON, *Annual President;*
Bon. PORTAL, *Honorary & Perpetual President;*
PARISET, *Perpetual Secretary.*

FINIS.